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ABSTRACT

Intended for teachers of adult basic education as well as teachers in job retraining programs, this book focuses on the development of written and oral language competencies required in occupational and training settings. The first four chapters offer a concise synthesis of recent research on adult learning and on workplace literacy for ten occupations: account clerk, auto mechanic, draftsman, electrician, heating/air conditioning mechanic, industrial maintenance mechanic, licensed practical nurse, machine tool operator, secretary, and welder. The fifth chapter presents instructional strategies and techniques for the development of job related skills in these occupations, and the sixth chapter discusses methods and information for technical vocabulary development. The appendixes include lists of high frequency and technical words often used in the ten occupations. (HOD)

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OCCUPATIONAL LITERACY EDUCATION

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Foreword

In *Occupational Literacy Education*, Timothy Rush, Alden Moe, and Rebecca Storlie perform a needed service for educators everywhere. Most educators are aware that the workplace is changing and that service and technical professions are growing. Few educators are aware, in specific, of what this means for the adults and adolescents they teach. *Occupational Literacy Education* provides glimpses of the sorts of reading, writing, and oral language adults face during training and on the job for ten different occupations ranging from account clerk to auto mechanic to licensed practical nurse.

High school teachers and reading specialists may be surprised at the difficult and complex literacy tasks which will confront their noncollege-bound students. Students anxious to leave high school so they can escape reading and writing should be brought face to face with the reality of on-the-job and training reading materials gathered in *Occupational Literacy Education*. Reading specialists will want to share portions of the book with vocational education, science, mathematics, and business education teachers who can borrow ideas to improve the real world basic skills of their students.

Occupational Literacy Education also will be useful to adult educators. Teachers of adult basic education as well as teachers in job retraining programs will appreciate the book's concise synthesis of recent research on adult learning and on workplace literacy. The recommendations of applications oriented instructional methods presented in the fifth chapter are particularly useful. Many adult educators who prepare students to take high school equivalency examinations (GED) have complained about the dearth of job oriented literacy materials to help adults see the connection between their learning and a chance to get a good job and improve the quality of

their lives. A mixture of GED materials and ideas from *Occupational Literacy Education* should provide a useful balance of learning experiences to keep adults motivated with practical reading tasks while they are also preparing for the less immediate academic reading tasks on the GED examination.

I have shared portions of this text with a number of experienced teachers. For many, the last direct experience with nonteaching work was a summer job held years ago during college days. Most are startled by the wide gap between their own memories of simple job literacy tasks of a decade or more ago and the complexities of the ten occupations studied by Rush and his colleagues. This startling glimpse of current workplace reality may, in the final analysis, be the most valuable contribution of *Occupational Literacy Education*.

Larry Mikulecky
Indiana University
Bloomington, Indiana

Preface

This book has been prepared for a varied audience of educators. Our primary goal, however, has been to provide adult and occupational educators with basic information for developing literacy and related occupational competencies. Chapters 1 through 4 present foundational knowledge as a basis for instruction.

We believe that teachers at every level of the educational process should recognize the value of applying literacy and literacy related competencies in work related contexts. Recommendations of applications oriented instructional methods are made in Chapter 5.

The vocabulary of work, with its combination of purely technical and multiple meaning words, should provide a basis for instruction in reading and basic occupational knowledge. Chapter 6 is devoted to methods of vocabulary development and lists of high frequency and technical words are presented in the Appendices.

Finally, we are grateful to our students, colleagues, and reviewers who have questioned our ideas and critiqued our work. Since this project began with all three authors working together in Indiana, and has been completed with the authors working in Wyoming, Louisiana, and Minnesota, respectively, it is difficult to recognize all who have helped. Nevertheless, we express thanks to the many individuals who contributed.

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Introduction to Occupational Literacy Education

Preparing people for success in occupational roles is a complex and difficult process. Functional competencies must be developed in critical areas ranging from affective characteristics, manual arts, and technical knowledge to mathematics, written language, and oral language. This book focuses on the development of written and oral language competencies required in occupational and training settings. Occupational literacy and the literacy competencies necessary for success in work and training environments are described. Building on the summary of human cognition, we offer instructional recommendations for developing occupational literacy and related competencies. The last chapter is devoted to methods of vocabulary development, and may be used in conjunction with the technical vocabularies listed in the Appendices.

The ability to competently read required, work related materials is defined here as *occupational literacy*. This definition, based on a concept of functional literacy (Kirsch & Guthrie, 1977-1978), is limited to competence with printed materials of all sorts. By definition, functional literacy varies according to individual demands of divergent roles, settings, and materials. Occupational literacy competencies comprise a subset of functional literacy. Required competencies vary from occupation to occupation and from job to job within occupations.

Occupational literacy development is an important aspect of prevocational, vocational, and on-the-job education. Occupational literacy related linguistic competencies—writing and oral language—also require instructional attention.

Literacy and Work

Until recently, little research has been done on the subject of work related literacy. The lack of information about the literacy requirements of specific occupations has been cited (Kirsch & Guthrie, 1977-1978; Sticht, 1980) as a serious obstruction to the development of effective occupational and literacy training programs. In their review of literacy programs in industrial, military, and penal settings, Ryan and Furlong (1975) noted only scattered reports related to the literacy requirements of industrial occupations. Systematic analysis of the literacy requirements of jobs, though relatively easy to conduct, has received little attention from researchers. Ryan and Furlong argued that, although many programs intended to improve adult literacy have been motivated by economic interests, the lack of research on occupational literacy makes it impossible to know if literacy training has any effect on successful employment.

Research on occupational literacy, sponsored largely by the United States Armed Forces, has provided insight about the extent to which reading is used in work and training settings and the nature of reading tasks in those settings. Sticht (1975) reported that incumbents in military jobs are consistently confronted with reading tasks which average two hours per work day. In the same report, Sticht noted that the difficulty of required reading materials often exceeded the measured reading abilities of successful workers. Kern (1970) observed results similar to those noted by Sticht. Disparities between reading requirements and reading abilities resulted in the disuse of technical manuals by military technicians.

In an examination of reading in the Navy, Sticht et al. (1977a) distinguished between two dominant uses of reading in occupational settings; *reading-to-do* tasks differ from *reading-to-learn* tasks in that the former are used to accomplish work while the latter involve retention of information for later use. According to this research, 75 percent of the reading tasks done by military personnel involve reading-to-do. In these tasks, written and graphic information is referred to and used, but is not learned. Sticht also noted that 1) materials encountered in reading-to-do are rarely unfamiliar to the worker; 2) such materials are commonly reread on a daily basis; and 3) the permanence of printed materials enables them to serve as a kind of external memory for workers.

A second study by Sticht et al. (1977b) analyzed reading-to-do tasks required of Navy personnel in ten occupations and training programs. The authors reported that fact finding and following directions are the most frequent reading-to-do tasks. Job related reading typically involves finding

facts or following directions presented in combined graphic and text formats. Workers and instructors used fact finding skills twice as often as they used skills in following directions; students used following directions skills twice as much as fact finding skills.

Literacy research on civilian occupations is less plentiful than research involving military occupations. Recent studies, however, indicate that the requirements of civilian occupations are similar to those of military occupations. Diehl and Mikulecky (1980) reported that, for a broad cross section of occupations, daily reading is almost universally required.

The amount of time spent on daily occupational reading in civilian contexts is substantial. In describing the reading habits of adults, Sharon (1973-1974) reported a median of 61 minutes spent on work related reading tasks. Mikulecky, Shanklin, and Caverly (1979) reported a mean of 73 minutes per day of work related reading. Diehl (1980) observed a mean work related reading time of 113 minutes per day. Diehl's figure is similar to the two hours per day reported by Sticht (1975) for military occupations.

Sticht et al. (1977a) and Diehl and Mikulecky (1980) called attention to important differences between the reading materials and processes observed in occupational settings compared to materials and processes observed in school settings. Reading-to-do tasks occur in about the same proportion in civilian occupational reading as in military contexts; reading-to-learn predominates in civilian occupational training settings.

In suggesting reasons why civilian and military workers can cope with reading demands which exceed their abilities, Diehl (1980) and Diehl and Mikulecky note the highly repetitive nature of on-the-job reading tasks and the influence of worker interest, motivation, experience, and specialized knowledge. They emphasize that workers can use extralinguistic cues (equipment and tools) to aid understanding. Diehl, however, observed that it may be inappropriate to view on-the-job reading materials as indicators of literacy demands, suggesting that such materials reflect only "opportunities" to use reading as a tool for increasing job efficiency and success. In most cases, workers have recourse to other sources (supervisors and co-workers, for instance) of necessary information.

Writing and Other Competencies

Diehl (1980) reported that in 64.7 percent of occupational writing examined, the task involved completing simple forms or preparing brief

memoranda. Writing tasks were repeated frequently enough for workers to master the most complex forms. Memoranda were simple, concise, and relatively easy to write. Diehl suggested that further research may show that writing competencies required for successful job performance are simple, and unrelated to the writing tasks observed in schools.

The nature of listening competencies required at work has received little attention from researchers. Sticht (1975), however, described studies which show that military personnel learn equally well through listening or reading and noted that it is possible for such personnel to learn from tape recordings played at accelerated rates.

A general sense of the importance of listening skills in occupational settings can be inferred from studies of adults in general. Rankin's study (1926) indicated that 70 percent of daily adult activities involve oral communication and 45 percent of communication involves listening. The amount of oral communication time typical of occupations varies considerably, but it seems likely that about 50 percent of such time requires listening.

It might also be inferred that the nature of reading and listening tasks in on-the-job and school settings is similar. Possible parallels between occupational listening and reading competencies, however, require examination through research.

Summary

Research dealing with the literacy competencies of occupations and training programs indicates that:

- reading tasks are part of virtually all occupations studied;
- workers perform reading tasks for major portions of the work day;
- reading materials and processes observed in work settings are distinctly different from those found in school settings; and
- occupational materials are successfully read by workers who seem to lack the necessary reading abilities.

Little is known about competencies related to occupational literacy. While writing tasks seem to be brief and highly repetitive in nature, occupational uses of oral language remain largely unexamined.

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Studies of Occupational Literacy Requirements

The studies which form the basis of this book were conducted in response to a need expressed by employment and guidance counselors, adult educators, and students in adult basic education, for information about the literacy demands of specific occupations. The occupations studied are frequently chosen as career goals by adult basic education students. Officials of educational and social service agencies confirmed the need to examine the following ten occupations:

Account Clerk
Auto Mechanic
Draftsman
Electrician
Heating/Air Conditioning
Mechanic

Industrial Maintenance
Mechanic
Licensed Practical Nurse
Machine Tool Operator
Secretary
Welder

Goals

While the work of researchers such as those cited previously has contributed to important knowledge about the nature of occupational reading requirements and abilities, much indepth study of reading and other linguistic requirements of work remains to be done. Knowledge of such factors, their interrelatedness, and their effects on job performance are

essential to those concerned with prevocational, vocational, and on-the-job training.

The goals of the studies discussed here were to 1) identify the reading, writing, listening, and speaking competencies required in ten skilled and semiskilled occupations; 2) compare those requirements with those in corresponding vocational training programs; and 3) evaluate the relative importance of the identified competencies to successful job performance.

Definitions and Assumptions

Occupational literacy, like functional literacy, can be a confusing concept. Functional literacy, for example, has been defined to include speaking, listening, writing, and computational competencies. Job success depends on many levels of competence. In occupational settings, job knowledge, experience, dependability, motivation, cooperativeness, and perseverance are important cognitive and affective qualities. Though not directly involved with literacy, competence with language and numerical processes is often necessary for successful job performance.

As mentioned earlier, the definition of occupational literacy used in these studies—functional competence in reading job related materials—was derived from Kirsch and Guthrie (1977-1978) who proposed that functional literacy be defined according to the demands of specific situations in terms of competency in reading alone. In their view, listening, speaking, writing, and computation involve functional cognitive competence. In these studies, listening, speaking, and writing were defined as literacy related competencies.

The following assumptions prompted and guided the investigations.

1. Reading, writing, listening, and speaking competencies are essential to worker success in the occupations examined.
2. Job supervisors view occupational literacy and related competencies as essential to successful worker performance.
3. Successful workers view occupational literacy and related competencies as essential to successful job performance.
4. Higher levels of literacy and literacy related competencies are required for success in occupational training programs than are necessary for success on the job.
5. The literacy and literacy related competencies required for success on the job and in vocational training programs are attainable by adults whose levels of literacy place them in adult basic education programs.

Population

The population in each study represented two groups, workers at job sites and students in training program courses. For each of the ten occupational categories, three job sites and three courses from a related training program curriculum were studied.

The thirty job sites studied were selected at random from an exhaustive list of employees representing a broad spectrum of business and industry in the greater Lafayette, Indiana (population approximately 115,000), area. At each job site, one worker and an immediate supervisor were involved. Workers were selected from pools of employees who had spent a minimum of six months on the job and who were judged by their employers to be functioning successfully in their work roles.

For each occupational category, three courses from a corresponding postsecondary vocational training program were studied. For the categories of electrician and heating/air conditioning mechanic, one course from an appropriate trade union apprenticeship program was studied. Each occupational category was involved with three courses from the curriculum of a state supported, postsecondary occupational training program. A total of twenty-five different courses were studied because the curricula of several of the occupational training programs had common course requirements.

Data Collection

Methods of data collection were similar in both job site and occupational training settings. Two thousand word samples of required reading materials were obtained from job site and occupational training program courses, including samples of textbooks, technical manuals, handbooks, instructional manuals for the installation and repair of equipment, memoranda and checklists written in informal and nonstandard English, and diagrams accompanied by clarifying words and phrases. When possible, passages were selected from materials according to the guidelines of the Dale-Chall (Dale & Chall, 1948) readability formula and the Fry Readability Graph (Fry, 1977). When samples were too brief for such guidelines to apply, entire samples were transcribed and analyzed. Some of the samples, such as memoranda and diagrams, were inappropriate for valid evaluation with the readability formulas used; such samples were, however, included as part of the corpus of language used to establish occupational vocabulary lists which appear in the appendices of this book.

Oral language requirements of the occupations studied were obtained by tape recording the oral language of workers or instructors and their coworkers or students during a typical one hour period of a workday. Oral language samples from training programs included both classroom and laboratory settings. Language recorded in this way was subsequently transcribed and keypunched for computer analysis.

Writing samples produced by workers and students in conjunction with their work and training activities were collected at each site.

Data Analysis Procedures

To determine the readability of required reading materials from the job and occupational training program sites, two well-known instruments were used. The Dale-Chall formula and the Fry Readability Graph were programmed in the FORTRAN language compatible with the Purdue University CDC 6600 mainframe computer. Each sample of required reading material was analyzed with both readability instruments. The readability results for each of the materials were then used to establish a readability range for work and training materials for each occupation.

Reading materials were examined with respect to the way in which they were used on site. Sticht's distinction (1975) between purposes for reading guided this aspect of the studies. The degree to which reading was used to accomplish work or to learn information was evaluated. Reading-to-do as opposed to reading-to-learn distinctions were made for required reading at each job and training program site. All required reading materials from job and training program sites were rated according to the level of formality of usage in which they were written.

Tape recordings of oral language produced on the job were transcribed and visually analyzed to establish the general level of English usage (Pooley, 1974).

Writing samples collected at each of the sites were evaluated for level of usage; legibility; and special characteristics such as inclusion of diagrams, sketches, and other aids to reader comprehension. Written and oral language samples were then combined. Computer programs were used to prepare technical vocabulary lists for each occupation as well as lists of the highest frequency words for each occupation and for the entire language sample.

Results of the studies are discussed in the following chapter.

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Literacy Competencies in Ten Occupations

This chapter presents and discusses the findings of studies of the reading, writing, and oral language requirements of the ten occupations and related training programs described in Chapter 2. The studies focused on the importance of reading to job performance, the amount of time spent reading, and how reading was used on the job. Reading and literacy related competencies necessary to successful job performance were examined through analysis of sample reading materials, handwritten communications, and tape recordings.

Data on competences required for success in occupational training programs were obtained through observations and from samples of reading, writing, and oral language from the curriculum of relevant vocational college programs.

On the Job

Literacy Requirements

Work related reading was performed daily by each of the workers involved in the studies. Consistent with the findings of Diehl (1980), Table 1 shows that reading was universally required of those studied, though there were variations in time spent reading and the nature of the reading task.

Table 1
SUMMARY OF ON-THE-JOB READING

Occupation	Average Daily Reading Time (minutes)	Type Material	Readability Score	Use	Frequency	Prose Style
Account Clerk	120	Correspondence, ledgers, lists, tables	Grade 13 to College Grad	To do	Daily	Informal, formal
Auto Mechanic	60	Technical references, memos, work orders	Grade 10 to College Grad	To learn, to do	Daily	Informal, formal
Draftsman	45	Technical references, blueprints, code books, reference books, memos	Grade 10 to College Grad	To do	Daily	Informal, formal
Electrician	120	Technical references, blueprints, schematics	College Graduate	To do	Daily	Informal, formal, technical
Heating/Air Conditioning Mechanic	45	Manuals, blueprints, memos	Grade 10 to College Grade	To learn, to do	Daily	Informal, formal

Industrial Maintenance Mechanic	42	Service manuals, handbooks, operating manuals, memos, workorders	Grade 10 to College Grad	To learn, to do	Daily	Informal, technical
Licensed Practical Nurse	78	Charts, tables, card files, handbooks, reference books	Grade 10 to College Junior	To learn, to do	Daily, weekly	Informal, formal
Machine Tool Operator	36	Manuals, handbooks, checklists, memos	Grade 9 to College Grad	To do	Daily	Informal, technical
Secretary	168	Reference books, tables, lists, letters, handbooks, memos	Grade 16 to College Grad	To do	Daily	Informal, formal
Welder	24	Blueprints, tables, memos	N/A	To do	Daily	Informal

Workers reported that they sometimes reread the same material several times per workday, and that such repetition was necessary. Repeated reading was recognized as a means of avoiding costly memory related errors. Workers' statements reflected the consistent view that careful readings of checklists, instructions, and directions were necessary to job success and security. For example, when asked if careless reading of on-the-job materials could affect work, a draftsman replied, "Definitely! The entire reliability of our finished product may rely on proper sizes and testing requirements derived from [reading] the [building] code."

The average time spent reading work related materials during the workday was 66 minutes, with a range of 24 minutes to 4 hours per day. This average reading time is similar to the 61 minutes reported by Sharon (1973). Studies by Diehl (1980) and Sticht (1975) found that workers engaged in work related reading for approximately 2 hours per day.

The difference between the findings of Diehl and Sticht compared to those of Sharon and the studies discussed here may be due to the use of differing definitions of reading. Lacking a comprehensive definition of reading, workers and supervisors probably did not include time spent reading information in formats other than printed discourse; the use of labels, tables, charts, figures, blueprints, schematics and checklists, may not have been considered aspects of reading. In fact, all of these studies may underestimate the actual amount of reading done by workers. Recent research by Mikulecky (1982) indicates that workers themselves underestimated by an average of 45 percent the amount of time they spent reading.

Reading-to-do work was the predominant use of reading in all occupations. Only licensed practical nurses and industrial maintenance mechanics reported reading on the job in order to learn information. Nevertheless, in these, as in the other occupations, reading-to-do was the dominant use of reading. Similar findings were obtained by Diehl (1980) and Sticht (1975) who, respectively, reported that reading-to-do constituted 66 percent and 75 percent of on-the-job reading.

Reading materials encountered by workers participating in the studies discussed here were varied in length, type, level of usage, and format. Table 1 reflects this diversity. Materials included single page memoranda, forms, procedural checklists, and lengthy handbooks. Memoranda and forms often employed informal, truncated usage. Example 1 presents samples from the account clerk and machine tool operator occupations which are typical of materials found in all occupations studied.

Example 1. Informal styles of reading materials: Account clerk and machine tool operator.

Account Clerk

1. Check paid invoice file.
2. Check completed purchase order.
3. Go back to original receiving order.
4. Check current invoice file.

Machine Tool Operator

1. Clean shavings from table.
2. Release locating pilots and clamp.
3. Remove pieces and lay them aside.
4. Position clamp bar, align stops, partly secure clamps.

The level of longer documents was generally formal, highly technical, and complex. Workers frequently were required to read texts such as those shown in Example 2.

Example 2. Technical styles of reading materials: Heating/air conditioning and nursing.

Heating/Air Conditioning

Room thermostats and remote bulb insertion and immersion thermostats shall be two pipe, of the proportional relay type, except where two positioned action is necessary, and the temperature settings and reset ranges shall be adjustable to best meet the actual operation conditions.

Nursing

Attached to the trachea, this gland is located beneath the larynx and above the sternum. It is U-shaped (two lobes connected by an isthmus) and secretes a hormone called *thyroxine*.

Rating of the English used in materials read by workers on the job was done using Pooley's varieties (1974) of English usage. For all occupations, except welder, the range of usage varied from nonstandard, informal, and ungrammatical through formal and highly technical.

The format of on-the-job reading materials, whether informal or formal and technical in style, usually involved graphic presentation of information. Tables, charts, graphs and figures appeared both in conjunction with and apart from written text. Workers were required to find and inter-

pret such combinations of text and graphic information to perform daily routines. Skill in reading graphic information in formats such as those shown in Examples 3 and 4 is an important occupational literacy competency.

Example 3. Text and graphic format.

Textual Format

Inspection Openings

All pressure vessels for use with compressed air, except as permitted otherwise in this paragraph, and those subjected to internal corrosion, or having parts subject to erosion or mechanical abrasion (see UG-25) shall be provided with a suitable manhole, handhole, or other inspection opening for examination and cleaning. (Pressure Vessel Code-book, p. 42)

Tabled Information

Building Element	Type I	Type II				Type III		Type IV	Type V		
	Noncombustible					Combustible					
	Fire Resistive	Fire Resistive	1 Hr.	N	1 Hr.	N	M.T.	1 Hr.	N		
Exterior Bearing Walls	4 Sec. 1803 (a)	4 1903 (a)	1	N	4 2103 (a)	4 2103 (a)	4 2103 (a)	1	N		
Interior Bearing Walls	3	2	1	N	1	N	1	1	N		
Exterior Nonbearing Walls	4 Sec. 1803 (a)	4 1903 (a)	1	N	4 2103 (a)	4 2103 (a)	4 2103 (a)	1	N		

(Uniform Building Code)

Graphic formats involving illustrations were found in each occupation. Example 4 shows a typical illustration.

Technical vocabulary presented special demands to workers in each occupation. Necessary words were sometimes purely technical, having single occupation specific meanings. More often workers had to recognize the occupational meanings of everyday words with multiple meanings.

Example 4. Typical illustration.



Wheel bearing adjustment can be checked by a push-pull procedure. Place one hand at ten o'clock on the out-board side of the tire. Place the other hand on the inside. Push and pull. Note any play. Adjust as necessary.

C. Storlie

Placement of Hands in Checking Wheel Bearing Play

Literacy Related Requirements

Samples of written language from the studies revealed that only rudimentary skills were required. When Pooley's criteria (1974) for levels of English usage were applied to the writing produced at job sites, distinctions between printed and handwritten prose were clearly evident. Whereas the level of printed reading materials was usually formal and highly technical, handwritten materials were informally written and could sometimes be classified as nonstandard English. The secretarial occupation stood alone in requiring a formal level of writing.

Clarity was the chief requirement of on-the-job writing. Typical handwritten communications were done in concise, ungrammatical, nonstandard English containing only essential information. Messages and memoranda omitted articles (a, an, the) and resembled the style of English found in telegrams. Example 5 shows typical written communications from occupational settings.

Example 5. On-the-job writing.

Nature of Trouble: Two lights out.

Action Taken:

1. Replaced tube in one light fixture.
 2. Replaced ballast in light fixture.
- Light operating now, but still needs new ceramic end connection.

Diversity of legibility in handwriting was tolerated as long as it did not detract from communication of important information. In most occupations, workers produced scripts which would probably be considered marginal by elementary and secondary school standards. Higher standards of legibility were expected in the drafting and secretarial occupations in which quality of handwriting represented the employer to outsiders.

Oral Language

Oral language use on the job involved the production and interpretation of clear but informally constructed English utterances. Much language encountered was social and not directly related to work. When talk was work related, it focused on specific tasks, tools, and equipment.

Speakers often worked at being understood—repeating, rewording, referring to similar tasks, and demonstrating as necessary. Listeners questioned, restated instructions, and acted out tasks to make sure they understood what they had heard. Then they acted on the information and instructions they had heard. Example 6 presents typical work related conversation.

Example 6. Work related oral language.

Account Clerk

"I think the credit is more than the debit. We would end up not writing a check, because we would get a debit from them for thirty-three eighty-four for two of these. We paid them because they gave us past due notices on them and Jones-Perkins finally put them through."

Secretary

"Yes, may I talk to Mr. Jones, please? I'm calling in reference to your telephone etiquette seminar. We don't have enough people to hold the class, so we're going to have to cancel."

Except in the secretarial jobs, in which formal usage was frequently employed, an informal level of usage typified on-the-job oral language. Clarity of communication was clearly more important than what might be termed "good grammar."

The Training Programs

Literacy Requirements

Reading was a daily requirement of students in all training program courses associated with the ten occupations. As in the research reported by Sticht (1975) and Mikulecky (1982), reading was required in both training and work settings, but the nature of reading differed in these settings.

In contrast to the job sites where reading-to-do prevailed, reading-to-learn was dominant in the training programs. In reading-to-do, short term memory serves to temporarily store the information for immediate use. In reading-to-learn, short term memory functions to organize information for storage in long term memory.

Compared to workers, students spent much more time per day reading. During the school day and after hours, students read in classroom and laboratory situations, as well as during periods of independent study. Student reading, as estimated by instructors, ranged from forty-two minutes to six hours per day. Table 2 shows the estimated reading load for training programs corresponding to each occupation studied. The actual reading time for individual students was probably greater than the estimates shown. The table shows ranges based on estimates from three courses; most students were enrolled in more than three courses.

Reading in the training programs required extensive use of expository and descriptive prose. Textbooks, reference books, and sets of complex instructions were part of the daily required reading. In most required reading, students carefully studied and learned the information presented in text, graphic, and text/graphic formats similar to those found at the job sites.

Book length materials were used by students in classroom, laboratory, and independent study. Shorter materials in the form of quizzes, instruction sets, and chalkboard notes written by instructors were frequently encountered in the school settings. These materials, too, presented information in combinations of text and graphic formats.

The usage observed in the required reading materials was varied. As with materials from the job sites, styles ranged from informal and ungrammatical to formal, highly technical prose. Example 7 shows instances of informal and technical usage.

Table 2
SUMMARY OF TRAINING PROGRAM READING

Occupation	Average Daily Reading Time (minutes)	Type Material	Readability Score	Use	Frequency	Prose Style
Account Clerk	187	Textbooks, references, ledgers, chalkboard notes	Grade 11 to College Grad	To learn, to do	Daily	Informal, formal, technical
Auto Mechanic	108	Textbooks, references, figures, tables, chalkboard notes	Grade 9 to College Grad	To learn, to do	Daily	Informal formal, technical
Draftsman	174	Textbooks, references, blueprints, figures, tables	Grade 9 to College Grad	To learn, to do	Daily	Informal, formal, technical
Electrician	280	Textbooks, references, figures, tables, chalkboard notes	Grade 10 to College Grad	To learn, to do	Daily	Informal, formal, technical
Heating/Air Conditioning Mechanic	120	Textbooks, references, figures, tables, blueprints	Grade 11 to College Grad	To learn, to do	Daily	Informal, formal, technical

Industrial Maintenance Mechanic	300	Textbooks, references, figures, tables, blueprints	Grade 10 to College Grad	To learn, to do	Daily	Informal, formal, technical
Licensed Practical Nurse	360	Textbooks, references, figures, tables, charts, procedures	Grade 12 to College Grad	To learn, to do	Daily	Informal, formal, technical
Machine Tool Operator	60	Textbooks, references, figures, tables, blueprints	Grade 9 to College Grad	To learn, to do	Daily	Informal, formal, technical
Secretary	280	Textbooks, references, figures, tables	Grade 10 to College Grad	To learn, to do	Daily	Informal, formal, technical
Welder	187	Textbooks, references blueprints, figures, tables	Grade 8 to College Grad	To learn, to do	Daily	Informal, formal, technical

Example 7. Informal and technical usage.

Informal

Instructor (referring to a chalkboard diagram)

"Let's go back to those...to what's happening inside that stator winding. We've got a rotor with magnetic poles rotating. Right? Okay, what happens when all of a sudden we've got no magnetic load? Here we were inducing some current and now we don't have anything to induce against...."

Technical

Specifications

Work required for installation of electrical rough-in in precast concrete slabs.

1. In general, the electrical contractor shall
 - Provide all layout of holes through the precast concrete slabs to the general contractor for approval by the precaster.
 - Core drill through the voids in the precast slabs for installation of conduits and boxes.
 - Conceal all conduits for lighting, outlets, etc., in the fill above the precast concrete slabs.

In each of the training programs, a specialized vocabulary was present. Words which made up these technical vocabularies took two forms. True technical words, peculiar to each occupation, formed one class of technical vocabulary; the second component involved everyday words with special occupational meanings. Mastery of both types of technical vocabulary was essential to student success.

Writing

In occupational training, writing took the form of note taking and writing examinations and assignments. In all cases, accuracy of information was more important than standard English usage. Instructional emphasis on grammatical correctness was present in the secretarial courses, but was not apparent in other courses. There was similarity between training program and on-the-job requirements in this regard; only when poor writing interfered with clear communication was it considered a problem. Example 8 shows samples of written language produced by training program students.

Example 8. Typical student writing.

Examination Questions

Automotive Mechanic

Question: One cause of failure of an engine to start is?

Response: Wet distributor.

Welder

Question: What is the function of a regulator?

Response: Controls gas flow.

Handwriting produced by students, like that produced by workers, was often marginally legible. As with grammar and usage, poor handwriting was accepted unless it caused communication problems.

Oral Language

Oral language in training program classrooms and laboratories was less social than was the case at the job sites. Instructor-to-student and student-to-student interaction during formal meetings was consistently subject oriented.

The level of oral language usage during instruction was typically informal. Instructors did not read from prepared notes during lectures; their language was repetitive and often conversational as they presented and demonstrated concepts and methods.

Student talk during instructional sessions was normally restricted to brief questions and responses to questions. When directed toward peers, student talk was informal, but predominantly task oriented. Like those of their instructors, student utterances were informal and sometimes nonstandard. Example 9 shows excerpts of classroom and laboratory talk.

Example 9. Classroom oral language.

Heating/Air Conditioning Mechanic

Instructor: Does anybody need help getting started? Do you want to go through the problem where you find static?

Student: I have a question. Can you run your bathroom—our small bathroom—and the utility together?

Instructor: No. The proper way to do that is to put the utility room separate from the kitchen.

Electrician

Instructor: A thousand? Okay, a mill is going back to being one hundredth of a cent. It's going back to like property tax. Like one tenth of a cent, there are one hundred cents in a dollar. So, one tenth of one hundredth is what a thousand mills to a dollar is. It goes back to a tax rate.

Note taking was an important adjunct to listening in all training programs. Students regularly took notes during instructional sessions, those notes were similar to other forms of occupational writing produced by students and workers – informal and marginally legible.

Occupational Literacy and Readability Estimates

Readability refers to ease of understanding or comprehension of written text. Readability formulas have been developed to gauge the appropriateness of written materials for intended audiences. Popular formulas address two text based factors – sentence complexity and vocabulary diversity – in predicting readability. The Dale-Chall Formula (1948) and Fry Readability Graph (1977) were used to assess the difficulty of required reading material in these studies.

The scores of these formula methods require careful interpretation because text understandability or comprehensibility can be influenced by nontext factors such as reader interest and motivation, familiarity with text, task repetition, and the availability of information from graphics and other sources. Nontext factors may reduce the effective difficulty of any given text. The moderating effects of these factors are probably reflected in studies such as one by Sacher and Duffy (1978), who found that workers were capable of using information obtained from materials two grade levels above the measured reading abilities of the workers.

It seems likely that the scores of the Dale-Chall formula and the Fry Graph overestimate the reading skill levels necessary for successful performance by workers and students. It is not that these instruments were in error; they are widely used and accepted tools. However, they are among the popular readability formulas which rely solely on easily quantifiable aspects of printed materials. In occupational reading, whether on the job or during training, nontext factors enable workers and students to understand material which would be incomprehensible to persons who are disinter-

ested, unmotivated, or unfamiliar with the subject matter and nontext sources of information.

While teachers can have confidence in readability formulas as predictors of general levels of text comprehensibility, the limitations of formulas must be borne in mind. Many factors which contribute to the comprehension of written text are not assessed by formulas and some of these factors can be addressed instructionally. Methods of developing occupational reading skills during preoccupational and occupational training are described in Chapter 5.

Summary

Literacy and literacy related competencies were required in each of the workplace and training program settings examined in studies of ten occupations. Reading, writing, and oral language were used to meet work and training requirements by all workers and students who participated.

Work related reading involved slightly more than an hour a day on the job and more than twice that time in the training program. Reading materials were written in several varieties, ranging from informal to formal, technical styles. Important information was presented in text, graphic, and combinations of text/graphic formats. Readability formulas indicated high levels of text difficulty.

The difficulty of reading requirements was moderated by the nature of reading in occupational settings. On the job, reading involved repetitive use of the same materials from day to day. Once mastered, apparently difficult reading materials seemed inconsequential. Training program reading involved vocabulary, concepts, and information formats which were introduced and mediated through the instructional process. Like workers, students probably faced less severe reading demands than formula scores suggest.

Literacy related competencies—writing and oral language communication—required only rudimentary skills. Written communications, on the job and in the training programs, typically employed nonstandard or informal usage. Marginally legible handwriting was accepted in most work and training settings. Nonstandard usage and marginal handwriting were accepted unless they interfered with clear communication.

In oral language, clarity of expression, not standard English usage, was the criterion for competence. Speakers and listeners needed to be concerned about understanding, not usage.

The reading demands of the occupations examined were probably overestimated. The methods used to assess readability did not account for worker/student familiarity with the vocabulary and concepts found in required reading materials. The repetitive nature of on-the-job reading was not considered during the assessment of readability.

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Occupational Literacy and Human Learning

During the past two decades, research has contributed much to the understanding of the processes of learning and memory in human beings. It may never be possible to describe exactly how these processes operate, but studies from the fields of cognitive psychology, computer science, and education suggest possible structures of memory and several factors which are involved in learning and remembering. This chapter provides a foundation for the instructional recommendations contained in Chapters 5 and 6. Here the discussion focuses on the structure and organization of human memory, the process of learning and memory, factors which affect learning and memory, and implications for literacy education and occupational training.

Understanding Learners

The Structure of Memory

Human memory is described in terms of three interactive component systems: immediate, short term, and long term. The efficiency with which any of the systems operates affects efficiency of the others.

Immediate memory, which is sometimes called perceptual trace (Travers, 1977) and described as a temporary sensory store, is very limited in both capacity and duration. An example of immediate memory in action

(or inaction) can be taken from the daily experience of listening to the weather forecast. It is quite common for listeners to be aware of the broadcast without noting any of the key information. Similarly, most adults can recall the experience of having been introduced to a stranger, hearing the person's name, and forgetting it almost immediately.

Short term memory serves two important functions. First, it enables us to efficiently perform routine tasks requiring temporary storage of information. Second, short term memory enables us to store information in long term memory.

Short term memory is employed in tasks such as looking up and remembering a telephone number or remembering a list of tools and hardware which must be retrieved from one's basement or garage. Information is often rehearsed or organized in some way to facilitate retention in short term memory. Rehearsal of information is an effective means of facilitating memory for information over brief periods.

In cases where numbers or lists contain more than seven discrete items, reorganizing the items into smaller groups is known to be an effective means of enhancing short term memory. Telephone numbers and social security numbers are examples of long numbers which have been conveniently "chunked" for easy storage in short term memory.

It is also possible to organize nonnumeric information according to common characteristics. A long grocery list, for example, might be organized according to categories such as vegetables, meats, and dairy products. Similarly, such a list might be chunked according to the various aisles on which the items are located in a familiar grocery store. Organization of information in short term memory is critically important if that information is to be transferred to long term memory.

Long term memory was once thought to have unlimited capacity and duration; the existence of billions of cells in the human central nervous system suggested to many psychologists and educators that an equal number of bits of information could be stored. Reports of long forgotten memories being recalled in vivid detail as the result of surgical stimulation (Penfield, 1951) suggested that all experience was permanently stored in memory. Recent theory and research concerning human memory discount these once widely held beliefs. The capacity and duration of long term memory, though substantial, is limited and is affected by many factors, such as organization and practice.

Research suggests different models of the structure of long term memory, each dealing with the way in which information is organized to make efficient recall possible. Current models suggest that long term memory

may be viewed as a system involving: 1) hierarchical classifications; 2) simplified base structure representations of ideas expressed through complex language (Kintsch & Keenan, 1973); or 3) as dual systems which process events and incidents differently from semantic information (Tulving, 1972). In each model, the central importance of organization is clear.

As a potential tool for educators, each model of long term memory merits discussion. The hierarchical classification model is familiar in that it is similar to the way in which school curricula are organized; dogs and cats are classified as mammals which are classified with fish and birds as animals. Organization involving categories and subcategories makes retrieval straightforward because the information has been stored in a predictable place in memory.

The model of memory which proposes that semantic information (typically emphasized in educational settings) is stored in a form simpler than the surface structure in which it is perceived is based on experiments such as those conducted by Kintsch (1974). These studies indicate that it takes longer to comprehend information presented in complex sentences than the same information presented in simple sentences. In either case, while the syntax is soon forgotten the basic information—the base structure—is remembered. Kintsch's term *proposition* denotes the base structure stored in memory. In propositional form, the sentences "The boy threw the ball" and "The ball was thrown by the boy" are represented by:

Throw: AGENT (boy), OBJECT (ball).

Tulving's dual system model of long term memory is based on evidence that incidents or episodes are stored differently from other forms of information. Episodic memory seems to be organized chronologically; events are stored in the order in which they occur. Semantic memory involves facts, formulas, and language oriented information which must be organized in some way before it can be stored in memory.

Information retrieved from episodic memory tends to be modified. Successive accounts of eye witness experiences, given by the same person, tend to differ. Knowledge such as facts, formulas, poems, or songs—the domain of semantic memory—tend to be unmodified in recall.

Episodic and semantic memory systems are parallel with iconic and symbolic memory categories posited by Piaget and Inhelder (1973). Iconic memory consists of images derived from perception, and iconic memories, like episodic memories, are prone to inaccuracy. Symbolic memories can be characterized as typically verbal and, like semantic memories, tend to be accurate and stable.

Factors Affecting Learning and Remembering

At least five factors are important to the processes of learning and memory: attention, meaning, involvement, organization, and practice.

Attention is the key factor in learning and remembering information from any source. Efficient learners pay attention. In listening, reading, or other activities they look for connections between their knowledge of the world and what they observe. An important characteristic of efficient learning and remembering is the use of prior knowledge and experience to guide and focus attention. Research by Kintsch and Keenan (1973) suggests that information stored in short term memory may be used to organize information for storage in long term memory.

Meaning implies that information, in order to be learned and remembered, must be personally meaningful to the learner. It is important for the learner to "see" how information to be learned is related to what is already known. Verbal or written instructions for the operation of a tractor are understandable only to the extent that the person hearing or reading the instructions is familiar with tractors or similar machines.

Involvement refers to the need for physical or mental manipulation of new information. Information which is consciously compared and contrasted with previously acquired knowledge is more effectively learned and remembered than information which is more passively processed. Involvement, in the form of mentally rewording information, is an effective way to personalize and thereby learn and remember.

Organization of information seems to be an important factor and function of short term memory. Indeed, a major function of short term memory seems to be the organizing of information for storage in long term memory (Kintsch, 1977). Through this process, effective learners arrange new information according to cues which allow it to be connected to prior knowledge and, thus, remembered and recalled. In order to better organize and store new information, the search for connections between new and old should be a conscious component of the learning and teaching processes.

Practice, or application, is a critical factor in tasks which demand that information be remembered. In short term memory, new information must be rehearsed if it is to be remembered even briefly. Long term memory for information depends on periodic review. When too much time elapses after the use of information stored in long term memory, the information is lost and must be obtained from sources other than memory.

Clearly, immediate short term and long term memory systems are interactive. Short term memory borrows information from long term storage

and uses it to guide attention toward relevant information being processed by immediate memory. Appropriate information from immediate memory is then held in short term memory and, if the learning task demands, organized for storage in long term memory. Each phase of the process—attention, meaning, involvement, organization, and practice—affects learning and remembering. The three systems of memory and the factors involved in them interact in the processing of semantic information.

Learning and Remembering Semantic Information

Reading is a process which requires active mental involvement with the information presented. Effective readers pay careful attention to the meaning of the text they are reading. They actively involve themselves in connecting what they are reading with their existing knowledge and prior experience. They evaluate and interpret information as they read and either assimilate the information into their existing knowledge structures or, when the new information outweighs existing knowledge, accommodate the new information by modifying their knowledge structures (Pearson & Johnson, 1978).

In terms of their occurrence in daily work, activities involving reading account for substantial amounts of time. Results of the studies discussed in Chapters 2 and 3 indicate that workers are involved with tasks requiring work related reading for more than an hour each workday. Diehl and Mikulecky (1980) reported that workers in various occupational roles spend an average of 113 minutes per day reading.

Occupational training requires that students spend far more time reading than is spent by workers on the job. The average student in the training programs studied by the authors, spent approximately 3.4 hours per day reading occupationally related materials. This figure is probably a low estimate since only three courses from each of the full-time training programs were examined.

Reading tasks can be classified according to reader purposes. On the job, reading to obtain information for the accomplishment of work—reading-to-do (Sticht, 1975)—predominates. In educational settings, reading to acquire knowledge for later application—reading-to-learn—is most common. In neither setting, however, is reading-to-do nor reading-to-learn used exclusively.

Listening

It is not possible to discuss listening without also discussing understanding, learning, and memory. More than a passive perception of audi-

tory stimuli, listening is a process which requires a listener's active mental involvement. Effective listening depends on careful attention, meaningful involvement and organization, and frequent summarization of information, as listeners reconstruct the meaning of what is heard in light of their existing knowledge and prior experience.

Research on listening suggests that language use requires listening 45 percent of the time in daily adult activity. Classroom lecture settings require students to listen approximately 70 percent of the time at the elementary school level and 90 percent of the time at the college level. Yet, school students in lecture settings may listen only about 30 percent of the time (Nichols & Stevens, 1957). Adults tend to forget 50 percent of lecture content within 24 hours of hearing it. Typically, 80 percent of information presented in lectures is forgotten after two weeks.

Listening tasks have been categorized as monitoring, information getting, and critical listening. Monitoring corresponds to immediate memory. Auditory information seemingly "goes in one ear and out the other" until some external or internal factor causes attention to be focused.

Listening to acquire information can be divided into tasks which require that information be obtained for immediate use, and tasks which require the learning of information for later use. Listening to instructions for completing a written examination is a listening-to-do task. Listening-to-learn involves tasks such as note taking during classroom lectures.

Critical listening deeply involves the listener with the information being presented. Evaluation of the speaker's motives and of the information presented are important aspects of critical listening. Emotional factors may influence the listening process during critical listening; because of the emotional impact of the speaker's presentation, listeners may be influenced to accept or reject the message.

Implications

Whether in traditional classroom and laboratory settings or in adult basic education or on-the-job training programs, instruction should consider current theory and knowledge of learning and the implications for reading and listening. Understanding, learning, and remembering information require active involvement of the learner in the process of linking new information with existing knowledge and prior experience.

The concept of comprehension as a process of constructing meaning from new and old information (Pearson & Johnson, 1978) has important implications for all educators. It is particularly important in occupational

education where there are so many possibilities for concretely connecting the new and the old. Equipment, raw materials, and tools which can be used to help relate new information to existing knowledge and experience, are readily available in occupational and training environments.

Evidence of the structure and function of human memory suggests that instruction should be concerned with helping students to use their knowledge and experience to aid in the understanding and learning of new concepts and processes. It seems essential that teachers carefully consider the backgrounds of their students in preparing instruction, and include preview and review activities which call attention to the relationships between information learned earlier and that which is to be learned.

Instruction should also address the need for learner attention to the information which is to be learned. Motivation and interest are important to maintenance of attention so, whenever possible, teachers should use devices which help students to focus attention on relevant information. In occupationally related education, it may be enough to point out situations in which the information will be crucial, or how ignorance of the information might be dangerous or otherwise costly. In cases where the information cannot be readily related to work activities, teachers should at least indicate possible applications of the new information.

Meaningful involvement of the learner with new information is important to understanding and learning. When learners are actively engaged in relating new information to their personal experience, they tend to comprehend and remember it better than if they do not try to find such relationships.

Organization of information is an important consideration in the instructional process because research shows that clear, consistent organization of material to be learned aids both comprehension and memory. According to Bransford (1979), several factors seem important to good organization and comprehension. Clear expression of new concepts, main ideas, and relationships between ideas enhances understanding. Careful use of examples and nonexamples which represent important concepts is an important aspect of good organization which aids comprehension. Avoidance of irrelevant detail is valuable in the presentation of understandable information to learners. Finally, the language used to communicate new information should be syntactically simple; learners may be confused by sentence structures which are unfamiliar to them.

The conclusions of Irwin and Davis (1980) about comprehension and learning from text should be considered. They summarize several factors which contribute to the retention of written information: 1) information which is motivating and interesting is more easily understood and remem-

bered than information which is unmotivating and dull; 2) student familiarity with the pattern of organization of a written text is a valuable aid to understanding and learning; 3) immediate and periodic reinforcement, or review, of learned information aids recall; 4) graphic and pictorial aids which support textual information can assist understanding and memory; 5) questions which focus on personal application of new concepts, ideas, and processes contribute positively to learning; and 6) student use of newly acquired information contributes to retention. The similarity of these conclusions to those of Rosenshine (1983) and Berliner (1981) about effective teaching suggests that such factors contribute to the learning of both written and auditory information.

The learning of information can be enhanced through the use of effective strategies for learning. Bransford (1979) notes that effective learners actively monitor their understanding of information and seek clarification when in doubt. They are better able to use their experience to evaluate and elaborate information. They can identify the potential significance of new information better than less able learners can. This is consistent with research by Mikulecky and Winchester (1983), who observe that superior workers in nursing occupations are better at thinking through tasks and applying appropriate reading and writing strategies, than are less proficient workers. Moreover, effective learners seem able to put new information into personally meaningful contexts. Theoretically, teachers who provide exposure to and practice in the use of self-monitoring strategies will have a positive effect on learning by teaching students *how* to learn.

Summary

This chapter discussed the structure of human memory, human learning, and factors important to those processes. A description of the structure of memory posited the existence of three systems: immediate, short term, and long term. In any task requiring understanding, learning, and remembering, the three systems of memory interact with one another. Key factors in learning and memory are attention, meaning, involvement, organization, and practice. These factors can be managed by presenters of information (teachers and writers), as well as by learners.

Comprehension and learning are viewed as processes in which learners must be actively involved in seeking connections between new information and that which they already know. In both reading and listening tasks, instruction should focus on the establishment of such connections.

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Developing Occupational Literacy and Related Competencies

The previous chapter discussed the structure of human memory and the nature of comprehension and learning. It was suggested that teachers and students can enhance the processes of comprehension and learning through careful attention, meaningful involvement with the information to be learned, and the use of organizational strategies to form personally meaningful links between new information and existing knowledge.

This chapter presents instructional strategies and techniques consistent with current theory and research concerning comprehension, learning, and memory. Major headings within the chapter identify key occupational literacy and linguistic competencies: reading, writing, and oral language. Beneath each major heading, aspects of instruction are presented for a general audience of educators who might contribute to the development of essential job related skills. Specific references are made to teaching at prevocational, vocational, adult basic, and on-the-job education levels.

Reading

In this section, a distinction is made between the reading skills necessary to meaningfully interpret visual information and the cognitive processes required to put that information to work or to learn and remember the information for later use.

Occupational literacy requires skill in learning from written materials as well as skill in reading to accomplish specific tasks. Reading-to-learn involves thoughtful, reflective mental processing of information so that it can be recalled and used long after it is read. Reading-to-learn generates "working knowledge"; it involves long term memory. Reading-to-do work involves following written instructions and finding information for immediate use. In reading-to-do tasks, information is remembered no longer than a few minutes, so short term memory skills are essential.

The purpose of the reading task differentiates reading-to-learn from reading-to-do. Comprehension on the job and in training involves the same skills: interpreting expository prose and graphics, relating printed information to existing equipment and materials, and interpreting technical vocabulary. Differences lie in the extent to which learning and memory are essential. On the job, learning through reading is seldom required. In fact, memorization is often discouraged by employers who stress the use of handbooks and checklists to improve accuracy in job performance.

Characteristics of Occupational Reading Materials

Regardless of the work or training environment in which they are found, occupational reading materials require competency in dealing with special visual and organizational factors. One important characteristic of occupational reading materials is the high frequency with which graphic aids (figures, diagrams, charts, tables, and pictures) appear. The use of tables to convey important information in a clear and economical way is extensive. Graphics occur in conjunction with and independent of textual information.

Second, written or printed instructions or directions to workers and students frequently appear in on-the-job and training program settings.

Third, work and training program tasks frequently call for workers or students to interpret handwritten or printed materials which refer to some object or tool with which they are working.

Fourth, each occupation presents a specialized vocabulary which workers/students must recognize and understand.

Finally, occupational reading materials employ expository styles of organizing information. Although written and printed materials range from tersely worded memoranda to highly complex technical documents, they are heavily laden with references to important technical operations, concepts, and relationships.

Educators at prevocational, vocational, adult basic, and on-the-job levels can account for each of the mentioned factors in their dealings with students and workers. The balance of this section focuses on methods of

preparing students and workers for mastering reading related occupational competencies.

Reading-to-Do

Many of the reading skills relevant to this section are necessary in both reading to perform work and in reading to learning information. Skills which pertain to the characteristics of occupational reading materials in general are discussed first. The final part of this section deals with expository patterns of organization and the development of reading-to-learn competencies.

Graphic aids to comprehension which are typical of occupational reading materials include figures, diagrams, charts, graphs, pictures, and tables. Their purpose is to enhance reader comprehension of expository text. Since most readers ignore graphic aids when reading (which may reflect teacher admonitions in beginning reading experiences to "look at the words not the pictures"), formal instruction in how to interpret graphics seems necessary.

Methods of preparing readers to interpret effectively and use graphic aids in various school subjects are described by Sheperd (1978), Robinson (1978), and Singer and Donlan (1980). The recommendations which follow are applicable to occupational reading materials. References and examples from occupational settings are used as illustrations of how skills instruction can be applied to relevant materials.

Figures and diagrams are similar in that they usually take the form of drawings which illustrate textual information. Sticht (1980) notes that figures and diagrams often contain words which identify some aspect of the illustrated item. According to Robinson (1978), figures and diagrams are integral parts of explanations presented in accompanying written text. As such, they must be read in conjunction with the text through a series of back and forth referrals. A sound strategy for teaching learners to make good use of figures and diagrams is to train them to focus their attention on such graphic aids before examining the text itself. Learners should be encouraged to use a figure or diagram as a basis for preparing to read the accompanying text by setting purposes for reading. Just as readers can use headings and other print related cues as guides to more efficient reading, they can use figures, diagrams, and other graphic aids as cues for questions to be answered through careful reading.

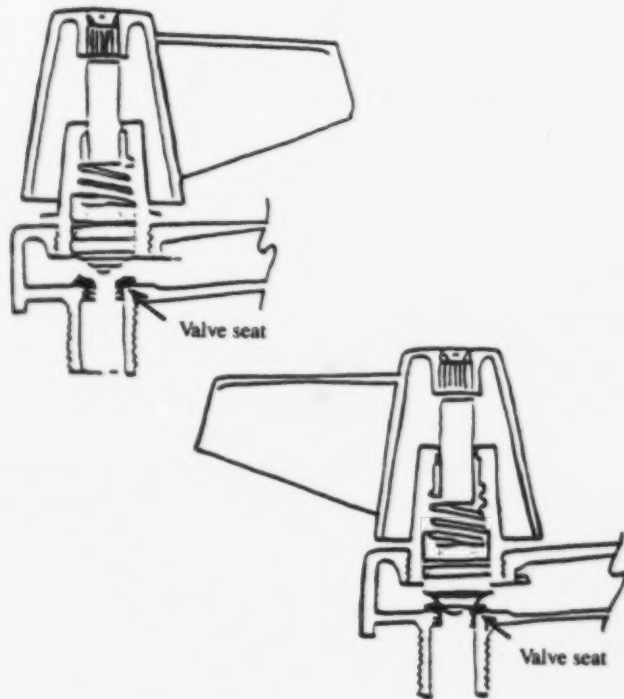
The illustrations which follow show arrangements of textual information in conjunction with figures and diagrams. The examples are taken from occupationally related materials, but similar patterns are commonly found in classroom mathematics and science textbooks.

Example 1

TEXT WITH FIGURES

Fixing a Leaking Faucet

Compression faucet. At the end of the stem of a compression faucet, is a washer held in place by a screw. When the faucet is turned off, the stem is screwed all the way down, and the washer fits snugly into the valve seat, stopping the flow of water. If the faucet is dripping from the end of the spigot, it is possible that either a washer or a valve seat has deteriorated.



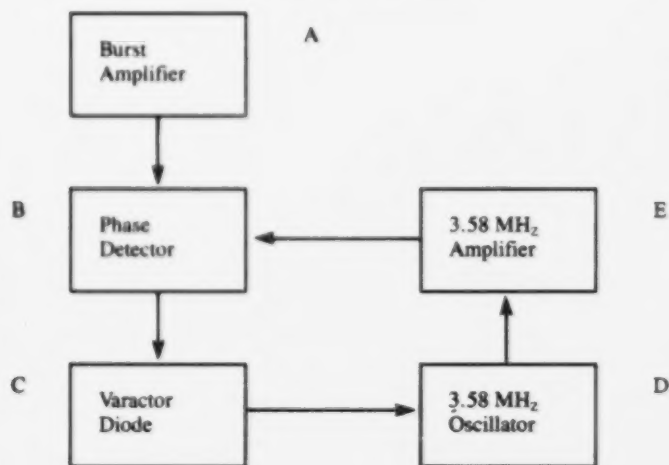
Top: Compression faucet is open. Bottom: Faucet is off, washer is compressed.

Charts show relationships between various components of an organization or process. Used frequently in the electronics and computer science industries, charts contribute clarifying concreteness by expressing complex information in visually simple formats. As with other forms of

graphic aids, learners may not fully use charts unless they are taught to attend to and interpret them.

Instruction in the use of charts should be based on the understanding that these graphic aids are provided by writers because they summarize detailed information from the printed text. Learners should be instructed to recognize the purpose of the chart and then determine the organization of the chart, identify the meaning of the symbols used, and relate the chart to the accompanying text. Examples (see Example 2) might be employed to develop skill in using charts to full advantage in occupationally relevant reading tasks.

Example 2
TEXT WITH CHART



- A. Amplifies the 3.58 MHz "burst" signal transmitted by the TV station. This signal is used as a reference for the demodulators to determine the beam intensity. The beam intensity, in turn, determines the proper amount of each color.
- B. Compares the output frequency of the 3.58 MHz reference signal oscillator with the burst frequency, and generates a correction voltage.
- C. Changes capacity as the correction voltage changes. This corrects the 3.58 MHz oscillator, making it the same frequency as the burst signal.
- D. Creates a 3.58 MHz reference voltage; provides the reference to the demodulators to obtain correct color signals.
- E. Amplifies the 3.58 MHz reference voltage for demodulators.

Graphs, like charts, summarize information which is presented in written or tabular form elsewhere. Three types of graphs predominate: bar (used to show differences in amount); line (used to show increases or decreases); and circle or pie (used to show proportional distributions of variables).

Guidelines for users of graphs should focus attention on the meaning of headings and labels, the comparison of information represented in the graph with textual information, and the evaluation of the relative importance of aspects of the graphically presented information.

Example 3 illustrates graphs found in occupational settings. In each case, the relevance of the information in the graph is determined by the text which accompanies it.

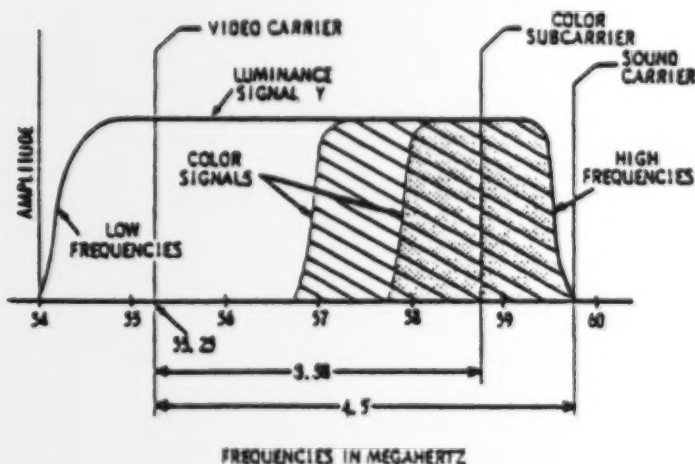
Example 3

TEXT WITH GRAPH

Color, Automatic Color Control, and Color Killer Amplifiers

The video signal is coupled from the output of the IF circuit board through resistor R817 to pin 11 on the chroma circuit board. Coupling capacitor C353, coil L351, resistor R359, and capacitor C354 form a wave-shaping network at the 3.58 MHz, color signal frequencies. The wave-shaping network passes the higher frequencies (color information) and limits the lower frequencies of the luminance signal.

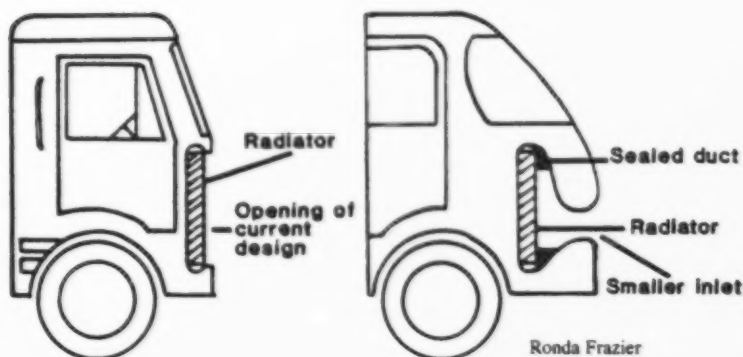
Complete Television Signal for Channel 2



Pictures are widely used in occupational settings and in occupational training. They often relate directly to a specific task, material, tool, or machine and are sometimes enhanced by arrows or circles which guide the user's attention. Because they establish a visual context which includes many environmental cues, pictures are useful and important aids to comprehension. Therefore, skill in the use of pictorial information is essential in occupational and training program settings.

Readers should learn to examine pictures as a prelude to reading for detail. The strategy of previewing and setting purposes before carefully reading the text should always include thoughtful examination of supplementary pictures. Example 4 shows combinations of pictures and accompanying text.

Example 4
TEXT AND PICTURE*



Current truck radiator installation design (left) requires flat front. Air resistance can be reduced by a streamlined design (right) where ducts bring sufficient cooling air to the radiator.

* Through design improvement, over-the-road trucks can function with radiator openings one-third as large as those used currently. Sealing of ducts is necessary so that all cooling air is directed to the radiator. Applications of such truck designs have existed in the aircraft industry for many decades. Automotive engineers should examine aeronautical engineering practices in their quest for aerodynamic efficiency.

Tables often accompany graphs and are used to summarize numerical or statistical information. In interpreting tables, as in interpreting graphs, the user must attend to the general heading of the table as well as to the headings of its rows and columns of numbers. Tabular information must then be compared and interpreted in light of the textual information it accompanies. In Example 5, the reader must associate the information in the table with the task at hand and with the information provided in text.

Example 5

TEXT AND TABLE

Low Hydrogen Electrodes

Hydrogen has harmful effects on alloy steels, causing intergranular cracks called hydrogen embrittlement thus lowering fatigue resistance and strength.

RIGHT HAND

DIGIT	COVERING COMPOSITIONS	APPLICATION (USE)
5 E-7015	Low hydrogen sodium type.	This is a low hydrogen electrode for welding low carbon, alloy steels. Power shovels and other earth moving machinery require this rod. The weld machines or files easily. Use DC, RP only.
6 E-7016	Same as 5 but with potassium salts used for arc stabilizing.	It has the same general application as 5 above except it can be used on either DC, RP, or AC.
E-7027	High iron oxide (Low Hydrogen). Flat and horizontal fillet weld position.	For low carbon alloy steels, use DC or AC.
E-7028	Iron powder (Low Hydrogen). Flat position only.	For low carbon alloy steels, use DC or AC.
8 E-8018	Iron powder plus low hydrogen sodium covering.	Similar to 5 and 6, DC, RP, or AC. Heavy covering allows the use of high speed drag welding. AC or DC RP may be used.

Low hydrogen electrode covering Compositions and Applications. These coverings will withstand a high temperature and therefore high currents (amperages) may be used.

Following instructions involves the ability to read and carry out written or printed instructions. It is an essential skill which requires methodical reading and intense concentration. When teaching learners how to follow written instructions, it is best to emphasize that such reading is hard work and requires a slow, careful approach.

The process of reading and following instructions parallels the reflective process of the Directed Reading-Thinking Activity (DRTA, described under reading-to-learn) and similar approaches to reading for learning and studying purposes. In reading to follow instructions and reading-to-learn, readers are required to be aware of their purposes, to demonstrate their comprehension, and to evaluate their interpretation of what they have read. The essential difference lies in the application of skills. In most situations, DRTA and similar methods are applied to chapter length segments of text; following instructions usually involves brief passages. Unlike reading to follow instructions, reading-to-learn from text seldom requires an immediate physical response from readers.

Instruction in reading and following instructions should include cautionary statements about the need for care and concentration. Also, practice should be required in applying a systematic, self-directed approach to samples of written instructions. Specific rules might be stated in this way:

1. Develop a mental set for what is to be done by reading the instructions once completely.
2. Read the first step carefully and do as it directs.
3. Reread the step and check your work.
4. Read, do, and reread each of the remaining steps until all are accomplished.
5. Reread and check your work for the whole set of instructions.

In most classrooms, a variety of materials is available for use in teaching learners to carry out instructions. Written instructions for daily assignments can provide frequent practice when used to full advantage by teachers. Such instructions, however, require careful attention from teachers. Poorly prepared instructions may cause frustration and discourage independent action by learners. The effect of carefully prepared instructions can be subverted by teachers who consistently repeat or restate classroom instructions since attention to instructions is unnecessary when repetitions are readily available.

A method of stressing attention to instructions is to provide written instructions, for which no supplemental help is available, for at least one activity per day. As learners develop skill with written instructions, the number of daily assignments can be increased.

The use of sets of instructions closely related to those encountered in the workplace is an important teaching consideration. Laboratory activities from biological, physical, and social science curricula are good sources of instructions. Mathematics textbooks may include many well-prepared problems which require careful reading. Educational games, model build-

ing kits, recipes, and instructions for household appliances are also good sources of material for extending practice of an important skill into the "real world."

Occupational and training tasks often require readers to interpret and integrate printed, graphic, and physical information to materials, tools, and equipment.

As in the case of instructions involving written language alone, it is important that learners understand the importance of slow, methodical reading and complete concentration when following instructions. This is especially true in tasks which combine written, graphic, and physical information. Given this understanding, rules can be taught for reading instructions which involve existing materials.

A set of guidelines, derived from a student self-evaluation checklist for science laboratory reading (Thomas & Robinson, 1977), is relevant to the many tasks which require reading to guide the manipulation of materials, tools, and equipment.

1. Skim the instructions to establish a mind set. Note titles, headings, and graphic aids, and read the introduction and study questions.
2. Familiarize yourself with any materials or equipment involved in the task.
3. Read the entire procedure.
4. Verify the meanings of words and symbols of which you are unsure.
5. Read and do each step with great concentration, paying special attention to difficult or unclear steps. These should be reread and thoughtfully interpreted.
6. Read numeric information with exactness.
7. Pay special attention to cautionary words such as *danger*, *caution*, *note*, and *attention*.
8. Make use of graphic aids by consciously relating them to both the text and equipment at hand.
9. Be alert to the order/sequence in which steps are to be done.
10. Reflect on what you are doing while you are working.
11. After completing the procedures, carefully evaluate what you have done in light of the instructions. Using a written or mental checklist, check off each completed step in sequence.

Learners should be made aware that concentrated effort is necessary to gain an understanding of the function or operation of materials, tools, and equipment.

Guidelines for such tasks should require that learners take active roles in planning controlled reading. First, headings, pictures, graphs, introductions, and summaries are surveyed to establish a mental set for subsequent careful reading. Next, purposes are set for reading small sections of the text. Careful reading follows with purposes in mind. Frequent back and forth references between print, graphics, and physical media are made to verify understanding. Then, in their own words, readers attempt to develop a brief explanation of what has been read. If only poor explanations can be stated, readers must reread to find the causes of the gaps in understanding. This procedure is similar to several procedures for effective reading and study, including the Directed Reading-Thinking Activity (Stauffer, 1980), which is described in the reading-to-learn section.

Reading-to-Assess

Students should work with reading materials and tasks directly related to those actually found in occupational settings. Whenever possible, reading materials should be used in worklike activities (Sticht, 1982). Reading-to-do tasks, involving finding and using information, should be addressed as essential occupational skills.

Analysis of *whether*, *when*, and *how* to use reading materials is a crucial occupational reading skill. Like skills in finding and using information, reading-to-assess skills can be practiced through teacher developed work simulations (Mikulecky & Winchester, 1983).

A work simulation might involve correctly setting an electronic wrist-watch. At a classroom center, learners would be required to select the appropriate reference from among technical textbooks, electrical handbooks, and sets of instructions for several electrical appliances.

Reading-to-Learn

The reading skills discussed in the previous section are as important in tasks requiring learning through reading as they are in tasks which require the accomplishment of work. With respect to learning, however, there are key aspects of reading which are more important than in reading-to-do tasks. These include the systematic approach to reading for study purposes and skill in interpreting information which is presented in the various organizational patterns used by writers of expository prose.

An orientation to the reading-to-learn process is acquired indirectly through most developmental reading programs. Such programs systemati-

cally prepare readers to make mental connections between their existing knowledge and the information they read. Approaches such as the DRTA are typical of developmental reading programs and involve the following steps or stages:

1. Previewing the material to establish a mind set for reading.
2. Setting purposes for reading by using headings, subheadings, and graphic aids as sources of questions to be answered.
3. Careful reading with purposes in mind.
4. Recitation—formulation of answers to questions or relating key information to prior knowledge. (These are always personalized responses in the reader's own words.)
5. Rereading as necessary to find answers to questions formulated in step 2 or to clarify relationships between the new information and prior knowledge.

Directed reading activities are effective tools in reading-to-learn because, through the process of rewording key information, learners are required to associate important ideas, concepts, and relationships with their prior knowledge. The recitation component usually involves the association of new information with prior knowledge through personally meaningful examples. Further, recitation serves as a method of self-monitoring comprehension; key points cannot be restated if they have not been recognized and understood.

Most approaches to developmental reading emphasize strategies necessary in reading-to-learn. Teachers can stress the relevance of such strategies in the world of work by planning lessons which highlight work related applications of reading. Frequent use of exercises involving occupationally relevant materials could enhance the practical value of preoccupational and occupational courses.

Essential organizational differences exist between narrative and expository prose. Narrative prose is typically organized according to a plot, or story grammar. Readers become familiar with narrative patterns through listening and reading experiences. Expository prose can be organized in one of several patterns which, because of their infrequent use in literature, require formal instructional attention.

The skills required for reading expository materials may be taught through early and frequent experiences with written materials which impart factual or technical information. Prevocational level social studies, science, mathematics, and developmental reading textbooks are good sources of such material. Tradebook authors such as Roy Gallant and Isaac Asimov have published many short, readable books explaining subjects of interest to upper elementary and secondary school readers. Such books can

be useful in developing skill in reading expository prose in its various organizational forms.

Social studies materials are written in styles also common in occupational reading materials. Patterns such as contextual definitions, enumeration of examples, classification of information, sequences of steps and stages, comparison and contrast, and cause and effect frequently appear in both social studies and work related contexts. Robinson (1978) presents detailed descriptions of these organizational patterns and their implications for instruction. Although his discussion focuses on social studies, it is quite relevant reading for those whose instructional concerns are related to other technical subjects. It is possible and appropriate for expository reading skills to be introduced in elementary school social studies and applied and practiced at each grade level through formal occupational training.

Prevocational classroom science and mathematics programs also employ patterns of organization which occur frequently in work related written materials. Common patterns include enumeration, sequence, comparison and contrast, cause and effect, and if/then relationships. Instruction in reading such patterns may begin in the early grades and continue for the duration of formal education.

Early and repeated experiences with materials written in expository style will enable learners and workers to focus their attention on key information without becoming confused by unfamiliar writing styles. Also, the importance of listening to expository prose being read correctly should be emphasized. For example, oral reading of difficult or unfamiliar material by an instructor who understands how punctuation affects phrasing provides learners with models to apply in independent reading. Teachers should encourage learners to read complex or difficult materials aloud as a means of aiding comprehension.

General recommendations concerning learning through reading include the use of an approach such as the DRTA in planned sessions involving short periods of intensive study interspersed with brief intervals of unrelated activity. Authorities recommend twenty minute periods of study in college level skills development. Long periods of cramming have little effect on long term retention of information and should be avoided. Learning through reading is much more effective when knowledge is gradually acquired and periodically reviewed.

In higher level prevocational courses and vocational education, students should focus on their long range goal, the acquisition of working knowledge, rather than on short term goals of merely "passing the test." Such a focus makes it more likely that learners will carefully plan study time and use appropriate techniques of reading and study.

Writing

A review of the third chapter shows that writing in skilled and semi-skilled occupations does not require a high level of sophistication. With the exception of the secretarial occupation, standard usage is less important than clarity of communication. Handwriting styles vary considerably, even in the drafting occupation. Hence clarity, as exemplified by legibility, is again the critical factor but a wide range of legible styles is accepted.

Clarity of written expression and handwriting seems to be of greater importance than standard usage in occupational communication. Thus, instruction in job related writing skills should focus on clear communication of information. A telegraphic style of writing, clear and concise, might be used to develop initial skills:

Smith,

Attach return hydraulic hose to frontloader. See me.

Jones

Messages such as this also could be used as a basis for instruction in standard forms of English usage. Exercises might require the combining of telegraphic phrases and sentences into more complex, fluent sentences.

Oral Language

Listening effectively is a crucial competency in work and training program environments. As in the case of reading, listening is used both to facilitate the accomplishment of work tasks and to enable the learning of information for later use. The purpose of the listening task determines the relative importance of short and long term memory. In either application of listening, similar skills are required.

The key skill in effective listening is actively focused attention. No matter what the situation, if the listener fails to focus on the message given by the speaker, no information is comprehended. Teachers need to demonstrate ways for learners to improve the ability to pay close attention during listening activities. One approach is to demonstrate the consequences of inattentive listening. Safety films, speakers from local businesses, and classroom activities which require learners to follow aural instructions or to relate personal experiences in which poor listening caused problems are methods of focusing on the need for improvement.

There are several causes of poor listening; most involve inattention. Comprehension of information is reduced when listeners allow their minds

to wander, allow themselves to respond emotionally to the speaker, are distracted by environmental factors, are distracted by annoying characteristics of the speaker, listen for detail rather than for central ideas, or are reluctant to work at listening.

In both listening-to-do work and listening-to-learn, the following guidelines can lead to more efficient processing information.

1. Use what you already know about the speaker's subject to help you listen and learn.
2. Try to anticipate what the speaker will say next.
3. Listen for main ideas and relationships between them.
4. Make frequent summaries of main ideas and relationships in your own words.
5. Monitor your comprehension of what is being said and think about it.
6. Ask questions when you are not sure that you understand.

In addition to these general guidelines, awareness of certain aspects of occupational settings might be stressed. In most job related situations, there are environmental factors which can be used to enhance listening. Speakers frequently refer to objects close at hand. Sketches are often employed to clarify the meaning of what is said. Rarely are instructions given outside a specific and familiar context. Thus, if listeners alert themselves to the available clues in the occupational settings, they will be better able to cope with the listening demands of those settings. Newcomers to a job or training program should be particularly attentive to available clues to listening. As they become familiar with people and equipment in their new surroundings, attention to relevant clues will become second nature.

Speaking

Clarity of communication is essential in occupational settings; however, leeway in levels of grammar and usage is granted in most situations. A short, clear, grammatically imperfect message is much preferred to a misleading, grammatically perfect one.

Perhaps the best advice to speakers in occupationally related settings is to focus on making sure the message is clearly understood by the listener. Several precautions can be taken to assure clear communication.

1. Prepare your listeners by helping them associate what you are going to say with what they already know. Tell them how the instructions you are giving are related to what you asked them to do yesterday. Establish a context for your information.

2. Use environmental clues to aid your listeners in attending and understanding. Equipment, pictures, and diagrams enhance listening and understanding.
3. Be attentive to nonverbal and verbal signs of inattention and/or confusion on the part of your listeners. Listener responses such as "uh-huh" or "yes" are not evidence of attention or understanding, especially when accompanied by vacant or puzzled facial expressions.
4. When your listeners seem inattentive and confused, restate your message in different terms.
5. Observe yourself as you give information or instructions. Be alert to actions or mannerisms which might be distracting or misleading.
6. Be clear in your use of context and environmental cues.

Fortunately for speakers, oral language allows for reinforcement of information so that miscommunication need not occur. The trick is to focus on making sure the message is clear and that listeners are receiving it.

Summary

This chapter has reviewed the nature of reading, writing, and oral language requirements in occupational settings and described some instructional approaches to provide learners with occupational literacy and related competencies.

Mikulecky's research (1982) shows that workers consistently read more diverse materials, in greater depth, for more times per day, and with greater purpose than do secondary students. Workers also view reading as more important than do students. These findings have important implications for teachers at all levels. Instructional attention must be given to reading-to-do skills, to finding and applying information which is presented in graphic form, and to following written instructions.

The required competencies are much less complex in writing and oral language than in reading. The focus of successful performance in these occupational literacy related areas is on clarity of communication. Learners in school settings should strive for mastery of standard English usage, but they should also become familiar with the telegraphic, nonstandard styles in which much occupational communication occurs.

In all instructional matters, a healthy concept for teachers to bear in mind is that knowledge and skills need application if effective learning is to

take place. By applying skills to occupational examples, two purposes may be simultaneously met: 1) Enhanced retention of knowledge and skills through realistic practice, and 2) genuine appreciation of the value of such knowledge and skills. It seems worth the effort to connect the school to the workplace.

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Technical Vocabulary Development

Teachers must focus on the essential knowledge and skills of their subjects. Reading and literacy related skills, critical to comprehension and learning, are part of the essential content of every subject. Yet it is doubtful that many teachers devote much time to direct instruction in such skills.

Mikulecky's research (1982) suggests the importance of increasing teacher awareness of subject related reading competencies. He found differences in the quality and quantity of reading in school compared to reading on the job, and observed that the reading demands placed on workers exceed those experienced by high school students. For example: 1) on-the-job reading requires more time per day than in-school reading; 2) workers read a wider variety of materials for more specific purposes than do high school students; 3) compared to technical school students, workers see reading as more important to success; and 4) workers do significantly more applications oriented reading.

If, as this evidence suggests, reading and related skills merit instructional attention before and during occupational training, a logical place to start is with the teaching of essential vocabulary. Each occupation has its particular set of requirements which include literacy and language competencies. Each has a specialized vocabulary essential to understanding, learning, and communication. The words which make up the technical vocabulary of a subject or occupation fit two categories: 1) True technical words, which seldom occur in normal usage (i.e., *suprarenal*, *syndrome*, *hypotenuse*, and *heliarc*), and 2) multiple meaning words, everyday words with special meanings (i.e., *field*, *root*, *leg*, *branch*, *strike*, *plug*, and *tape*).

In light of the strong relationship between word knowledge and comprehension (Davis, 1944, 1968; Spearitt, 1972) and learning (Anderson & Freebody, 1979), the need is clear for systematic instruction which emphasizes meaningful application of knowledge and skills. Such instruction should enable learners to independently determine the meanings of unfamiliar words.

Awareness of Words

A comprehensive program of vocabulary development should create a general awareness of words and their relationships as a prerequisite to instruction in specific vocabulary skills. Such an awareness can be fostered through methods described by Johnson and Pearson (1984) and Johnson (1984). Their instructional recommendations stress the need for connecting words to the various contexts in which they might occur. Several related methods are appropriate for accomplishing such instruction.

A method of showing connections between words and contexts, known as semantic webbing or mapping, seems particularly valuable in specialized and occupational studies. The basic procedure for constructing a semantic map involves 1) selecting a key word, 2) brainstorming as many related words as possible, 3) categorizing the related words, 4) preparing a diagram which shows word relationships, and 5) optionally selecting a word from the map to serve as the core of a new map.

Example 1 shows a possible semantic map of the word *pressure*. Maps such as this are useful because they graphically illustrate the relationships between words and the differing shades of meaning which they take on in different settings.

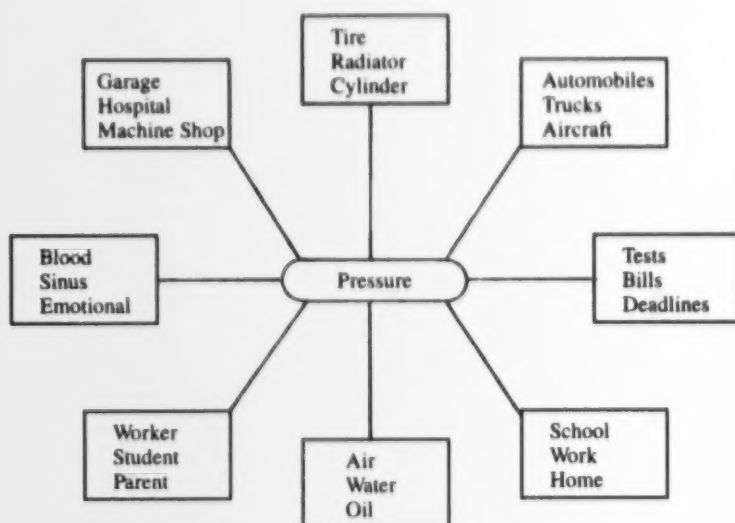
Semantic mapping can be modified to emphasize the value of learning word parts—prefixes, suffixes, and roots. Example 2 presents a map of the Latin prefix *trans* (across).

Maps of word parts illustrate the relationships between similar words. Also, maps graphically present the power of mastery over word parts; knowing the meaning of *trans* unlocks virtually scores of words for the reader.

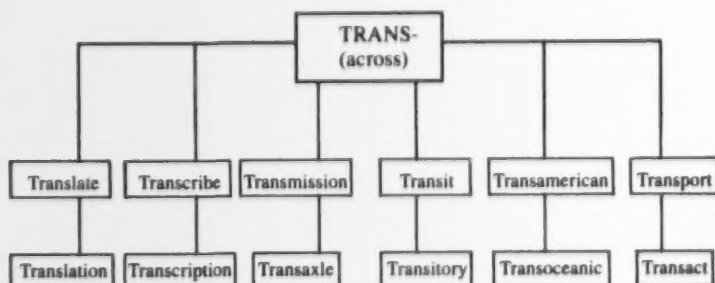
Semantic feature analysis is a second method of orienting learners toward words and word relationships. Like semantic mapping, this method requires learners to use their knowledge and experience to expand their vocabulary. Use of semantic feature analysis requires these basic steps: 1) selecting a category or topic, 2) identifying terms to list beneath the category, 3) listing features in a row beside the category, and 4) marking correspondences between words and features.

Example 3 shows a semantic feature chart for the category, *tools*.

Example 1
SEMANTIC MAP—KEY WORD



Example 2
SEMANTIC MAP—WORD PART



Example 3

SEMANTIC FEATURE ANALYSIS

Terms	FEATURES				
	Measure	Adjust	Cut	Cars	Build
Pliers		x		x	x
Tape	x				x
Caliper	x	x		x	x
Screwdriver				x	x
File			x	x	x

After awareness of words and word relationships has been developed through the foregoing methods, independent vocabulary skills can be taught. Training in specific vocabulary skills can be based on the recommendations of Deighton (1959), who described the importance of context clues, word analysis, dictionary and glossary use, and other text based aids.

Context Clues

Learners and workers should be made aware that context clues are efficient and powerful tools for determining the meanings of unfamiliar words. In most situations, readers can apply their knowledge of the context surrounding an unfamiliar word to determine its meaning. Teachers and learners should be aware, however, that context clues are not foolproof. Context at best reveals only a single meaning and frequently provides only partial meaning. Context contributes to vocabulary growth in proportion to the amount of reading done. In general, reliance on context alone yields very gradual vocabulary growth.

Context clues may be more effective in specialized subjects and occupational settings in which expository materials are prevalent. Writers of technically oriented textbooks and reference materials commonly employ devices which increase the value of context in determining word meaning. *Definition*, *example*, and *restatement* are three frequently used literary devices which clarify the meanings of key words in technical writing. In fact, Deighton (1959) recommended these devices to writers as means of enhancing the value of context as a tool for vocabulary development.

An instance of the use of *definition* follows:

Flashing is then installed. Flashing is sheet metal installed around the base of the chimney so that water is prevented from running under the roofing material.

Here, the writer has deliberately provided a clear definition of the term immediately after its introduction.

Example is very often used in technical writing to clarify new words. Orienting skills, *especially* map reading and compass use, are essential to the wilderness hiker.

In this case, the writer has used the word *especially* to signal the reader that a clarifying example is about to be presented. Other words which signal examples include *such as*, *for example*, and *for instance*.

Restatement may not be as clearly connected to the unfamiliar word as definition or example, but awareness of this device can be an asset to readers of technical materials. In the following sentence, the writer has presented the meaning of the new word without using a separate sentence or a signal word.

The technician sometimes makes a *hypothesis*, an educated guess, about the cause of a malfunction.

The term *hypothesis* has been restated in more familiar words.

Word Analysis

A second major component of a program of technical vocabulary development is word analysis. Its use requires knowledge of word parts and their meanings—prefixes, suffixes, and word roots. There is some disagreement about the amount of emphasis the study of word parts should receive, but in specialized fields such study seems appropriate. High frequency word parts with consistent meanings should be considered part of the content of specialized and occupational studies.

Lists of word parts which have utility in general education can be found in Thomas and Robinson (1977), Sheperd (1978), and Deighton (1959). Examination of the vocabulary of work, presented in the appendices, suggests that the following prefixes and suffices should be taught in occupationally oriented programs.

Prefixes

a, ab (away from)
ad (to, toward)
com, con (with)
de (from)
dis (apart, not)
en (in)
ex (out)
im, in (in, into)

non (not)
ob (against)
pre, pro (before)
re (back)
sub (under)
trans (across)
un (not)

Number prefixes

uni, mono (one)
du, bi (two)
tri (three)
quad, tetra (four)
quin, pent (five)
sex, hex (six)
sept (seven)
oct (eight)

dec (ten)
cent, hect (hundred)
mill, kilo (hundred)
semi, demi, hemi (half)
mega (million)

Suffixes

able, ible
age
al
ance
ant
ate
ble
ent

er, or
ing
ity
ly
or
sion
ship
tion

Roots derived from Latin and Greek which have occupational applications

acqu, hydra (water)
aud (hear)
auto (self)
bio (life)
duct (lead)
equ (equal)
fract, rupt (break)
geo (earth)
mag, magni (great)
man, manu (hand)
meter (measure)

mis, mit (send)
mov, mot (move)
par (get ready)
pli (fold)
part (carry)
sta, stat (stand)
spect, spic (see)
string, strict (tighten)
tract (draw, drag)
vid, vis (see)

Graphic aids

In addition to context and word analysis, another text related factor—graphic aids—contributes to vocabulary development. A previous chapter presented procedures for teaching learners how to take advantage of graphs, tables, figures, and pictures to aid comprehension. Example 4 illustrates the value of graphics in defining key words.

Context clues, word analysis, and graphic aids, used alone or in concert, enable readers to determine word meanings effectively and efficiently. In work and training settings, it is sometimes necessary to know complete and precise definitions of key words. Thus, skill in using glossaries and dictionaries is important to both workers and students.

Glossaries are included in many textbooks and reference materials found in occupational settings. Although glossaries provide the precise meaning intended by the writer, they are frequently overlooked by the readers. Readers should recognize that while most glossaries appear as appendices to entire books, writers frequently place glossaries in chapters or in page margins near the first occurrences of key words. Margin glosses are shown in Example 5. Note the proximity of the glosses to the words they define.

Dictionaries are often the last resort in the search for word meaning because, like glossaries, their use requires interruption of the reading act. Nevertheless, the ability to use dictionaries is important because they may be the only sources of knowledge about word pronunciation and precise meaning. Dictionaries also reinforce the importance of context; they require readers to choose from several definitions the one which best fits the context in which the unfamiliar word has occurred.

To Elementary Educators

Thus far, this chapter has dealt with recommendations to instructors of specialized and occupationally related subjects. There is much that can be done at earlier stages of the educational process to inspire interest in and awareness of words. The intensity of focus will vary according to the grade level of the learners, but teachers should be sensitive to opportunities to connect words, word parts, and vocabulary skills with the world of work.

The strategy of connecting vocabulary with occupational applications can be employed early in the educational experience. Many words which have special meanings in work settings are introduced in elementary school

Example 4

GRAPHIC DEFINITION

TOOLS

SCREWDRIVERS



Square blade shank can take wrench

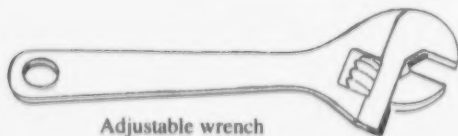


Standard blade and tip for general use

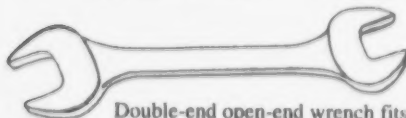


Stubby screwdriver for tight spots

WRENCHES



Adjustable wrench



Double-end open-end wrench fits two sizes

Example 5

MARGIN GLOSSES

The cursor shows where something will happen next.

In Apple Writer words automatically wrap around to the next line. Word wraparound means automatic carriage return.

Typing Text

The display should be blank, except for the blinking *cursor* and a row of letters and numbers across the top called the *Data Line*. The Data Line is important to many of Apple Writer's commands and capabilities, as you will see later. Before we learn about the Data Line, though, let's learn the basics. You bought Apple Writer because you wanted to type documents, so let's type.

Did you notice the display when the cursor moved to the end of the line? When there wasn't enough room for a word at the end of the line, the cursor took the word and automatically moved it down to the beginning of the next line. It's an automatic carriage return, commonly referred to as *word wraparound*.

Keep typing (type anything you want) until you feel comfortable with the idea of not pressing RETURN at the end of each line.

From AppleWriter II for IIe only. Permission granted by Apple Computer, Inc.

subjects. Teachers should routinely remark about the work meanings of such words.

Many of the prefixes, suffixes, and roots listed occur in primary grade reading materials. Words in which these parts appear can be readily associated with words from technical fields.

Field trips to school laboratories, shops, kitchens, nurses' offices, and administrative offices can help promote vocabulary awareness and growth when materials and equipment are labeled. Similarly, key words can be taught prior to and reviewed after class outings.

The recommendations of this chapter are not exhaustive. Teachers who wish to strengthen their vocabulary development programs should read the references cited. Works by Dale, O'Rourke, and Bamman (1971) and Johnson and Pearson (1984) should be of particular value at the elementary school level.

Summary

This chapter, suggesting that few teachers deal effectively with technical vocabulary, has presented methods and information for vocabulary development. In any situation in which reading and word knowledge are important to human performance, formal instruction in vocabulary development is necessary and relatively easy to provide. Instructional methods from several sources have been recommended. Especially useful are those described by Johnson and Pearson because such methods as semantic mapping and semantic feature analysis are both excellent and appropriate for those who teach children or adults.

Instructional techniques have been described, but methods and materials are only part of vocabulary development. Teacher awareness of the close relationship between word knowledge and comprehension may be the essential element in bringing technical vocabulary instruction into every classroom.

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Appendix A

Highest Frequency Words for Ten Occupations

The following list shows the 100 words most frequently used by adults in a study of ten skilled and semiskilled occupations and related training programs. The list is based on combined samples of written and oral language from all job and training program sites. The words comprise 45 percent of all language sampled.

Total Words = 180,000
Unique Words = 9,000

the	will	your	see
of	one	was	more
to	not	get	these
and	an	has	into
a	there	must	just
is	can	any	them
in	when	he	down
it	out	got	time
for	we	know	about
that	which	them	been
you	what	don't	some
be	do	each	business
or	up	air	how
on	pressure	check	its
are	two	that's	back
I	so	but	over
this	they	system	work
with	here	through	would
as	other	valve	temperature
by	okay	going	same
if	right	well	also
have	no	use	where
all	used	than	now
at	may	it's	only
from	should	go	like

Appendix B

Technical Vocabulary Lists

This section contains two vocabulary lists derived from written and oral language samples from each of ten occupations. For each occupation, a brief list of high frequency technical words precedes a complete technical vocabulary.

Common words from everyday adult language (found in the most frequent 1,000 words of the Kucera-Francis list, *Computational analysis of present day American English*, Brown University Press, 1967) have been deleted from the technical vocabulary lists. Also removed are numerals; labels; names of people, places, products, and companies; contractions and possessives; and colloquialisms.

Some of the words in the lists are uncommon words which may not be technical in nature. The lists should, therefore, be treated as sources rather than standards. In each technical vocabulary list, the most frequent words are marked with asterisks.

The following table shows the total number of words and the number of unique words contained in the original language sample for each occupation.

VOCABULARY DATA

Occupation	Total Sample Words	Unique Words
Account Clerk	20,055	2,981
Auto Mechanic	20,900	3,034
Draftsman	27,874	3,414
Electrician	20,492	3,126
Heating/Air Conditioning Mechanic	19,937	2,841
Industrial Maintenance Mechanic	21,000	3,164
Licensed Practical Nurse	24,964	3,955
Machine Tool Operator	15,200	2,473
Secretary	15,259	2,492
Welder	13,687	2,375

HIGH FREQUENCY WORDS ACCOUNT CLERK

accountant	debts	maintains	reasonable
accounting	depreciating	monthly	receipts
accounts	depreciation	net	receives
actual	dollars	nine	related
add	eight	offer	reports
annual	employees	organization	request(s)
application	exempt(ion)	owners	revenue(s)
appropriate	expense(s)	partially	sale
assets	fees	partner(s)	sell(ing)
balance	fifty	partnership	separate
bank	file	payment(s)	shares
businesses	fund(s)	payroll	sheet
capital	gross	percent(age)	sold
cash	inventory	prepares	statements
check(s)	investment	principal	stockholders
computes	item	profit	taxable
contract	joint	proprietor	taxes
corporate	legal	purchase(d)	thirty
corporation	liability	purposes	twenty
credit	liable	quarterly	wages
date			

TECHNICAL VOCABULARY ACCOUNT CLERK

ability	afraid	asking	binary
abrogate	agencies	assembly	binding
absence	agency	assessed	bit
academic	agent	asset(s*)	biweekly
accept(s)	agree(ment)	assign(ed)	bonds
(ed) (ance) (ing)	(s)	(ment) (s)	books
accident(s)	aids	assistance	border
accommodate	aliens	assistant	borrow(ed)
accommodating	allegation	assisting	(er) (ing)
accompanies	allocate	assists	bought
accomplish	allocation	associate(d)	bound
accord(ance)	allow(ed)	assume(s)	boundaries
accountant*	(s) (able) (ance)	assuming	brackets
accounting*	alternative	attach(ed)	breach
accounts*	amended	(ment)	briefly
accrual	amendment(s)	attempted	bringing
accrued	amortized	attorneys	broad
accumulate	amounts	attributable	broken
accurately	ample	audit(ing)	budget(ed)
achieve(ment)	analyze	(or) (s)	busiest
acknowledge	analyzing	authority	businesses*
acquired	annual*(ly)	authorized	businessman
acquisition	annuity	auxiliary	buy(er)
act(ed)	answers	avoid(s)	(ing)
(s)	apparent	aware	bylaws
actions	appearing	background	calculate(d)
actual*	applicable	backing	calculating
ad	application*	balance*(s)	calculation
add*(ing)	applies	bank*(s)	calculator
(s)	apply	bargain(ing)	calendar
addends	appointment	(s)	calling
adequate	appreciable	base	canceled
adjust(ed)	appropriate*	beats	cancellation
administer	approval	becomes	capacities
admission	approved	beg	capacity
adopted	arbitrary	begin	capital*
advance(s)	arguments	behalf	carefully
advantage(s)	arise	beneficiary	carload
advantageous	arising	benefit(ed)	carry(ing)
advertising	arithmetic	(ing) (s)	cash*
advisable	arrangement	bias	catalog
affect(ing)	arrive	biggest	caused
affiliated	arriving	bilateral	centralize
affirmative	article(s)	bill(ed)	cents
afford	artificial	(ing) (s)	certificate

ACCOUNT CLERK (continued)

challenge	comparative	continuity	decimal
changed	compared	continuous	decisions
changing	comparison	contract*(or)	decrease(d)
chapter(s)	compensation	(s) (ual)	(s)
characteristic	completed	contribute	deduct(ed) (ible)
charge(able)	compliance	contribution	(ing) (ion) (ions)
(d) (s)	complies	control(led)	deemed
charitable	comply	(ling) (s)	defect(ive)
charter	compounded	convention	(s)
check*(ing)	comprehension	convert(s)	defined
(s*)	comptroller	conveyed	definite
circular(s)	computation	copies	definition
cited	compute(d)	copy	delay(ed)
citizen(s)	(s*)	corporate*	(s)
civic	computer(s)	corporation*	delegation
civil	computing	correct(ion)	delinquent
claim(ed)	combination	(s)	deliver(y)
(s)	concentrate	correspond	demand(ed)
clarification	concept(s)	council	denomination
classification	concern(ing)	counsel	denominator
classified	conclusion	count(er)	deny
clause	conclusive	(s)	depend(ent)
clean(ing)	condition	courses	(ing) (s)
clear(ed)	conduct(ed)	courts	deposit(ed)
(ing) (s)	confidential	cover(s)	(or) (s)
clerk	confined	coworkers	depreciating*
closing	conflict	create(d)	depreciation*
code(d)	conform	(s)	deprive(d)
(s)	consent	creating	describes
coding	considerable	creation	description
coin(s)	considerate	credit*(ed)	designated
collect(able)	consider(ing)	(ing)	desk
(ed) (ion)	(s)	creditor(s)	desperate
column(s)	consist(ent)	criteria	detail(s)
combination	(s)	criticism	deter(mination)
combined	consolidate	crucial	(mines)
combining	constitution	cumulative	determining
commerce	construed	currency	devoted
commercial	consume(d)	custom(ary)	diamond
commission	(r)	customer(s)	dictate
commodities	contact(s)	damage(s)	differential
commonly	contained	date*(s)	difficulty
communicate	contains	debit(ed)	digits
companies	contemplate	debt(or)	diligence
comparable	continues	(s*)	dire

ACCOUNT CLERK (continued)

directed	effecting	estate	facilities
directors	efficiently	estimated	factions
disabilities	eight*	estimates	factor
disability	eighteen	etc.	factory
disagreement	eighty	evenly	facts
disbursement	elect(ion)	event(s)	fails
disclaim	electronic	everybody	failure
discount	eleven	evidenced	fair
discovered	eligible	evident	falling
discriminate	eliminate	examination	falls
discuss(ed)	emerge	examine	false
(ing) (ion)	employed	examples	familiar
disposal	employee(s*)	exceed(ed)	families
disposing	employers	(s)	fault
dissolution	employs	exception(s)	favorable
dissolve(d)	enable	excess	feature(s)
(s)	enact	exchange	fee(s*)
dissolving	encumbered	excluding	fifteen
distinct	encumbrance	exclusively	fifty*
distinguish	ended	excusable	figuring
distribute	ending	excuse	file*(d)
distributing	ends	executed	(s)
divest	enforce(able)	execution	filing
divide(d)	engage(d)	executives	filled
dividends	engaging	executory	finance
dividing	enhanced	exemplified	financial
divisor	enjoyed	exempt*(ion*)	finding
doctrine	enriched	(ions)	finds
document(s)	enrolled	exercise	finish
dollar(s*)	enter(ed)	exhibit	firms
double	(ing) (s)	exist(ing)	fit
dozen	enterprise	(s)	fix(ed)
draft	entertain	expanded	flexibility
drawers	entirely	expecting	flight
drawings	entities	expects	flow
drawn	entitle(d)	expenditure	follow(s)
draws	entity	expense*(s*)	forced
dues	entries	explain(ed)	forcefully
duplicate	entry	explored	forever
duration	equal(ly) (s)	express(ed)	forget
duties	equity	extended	forgot
duty	errors	extends	formal
earn(ing)	essential(ly)	extension	formation
(ings)	establish(ing)	extra	formed
educational	(ment)	facilitate	formerly

ACCOUNT CLERK (continued)

forming	holder	insolvency	juror(s)
formula	holding	inspect(ion)	jury
formulation	hospitals	installment	keeping
forth	hotels	instance(s)	key(punched)
forty	hourly	institution	kinds
forwarded	housecleaning	instruction	label
foundation	housing	instructor	lag
fourteen	hundreds	instrument	laid
fractions	hundredths	insufficient	lately
freely	identical	insurance	latent
freight	illegal	insured	lawful
frequency	illustrate	intangible	laws
frequently	illustrating	intended	lawsuit
Friday	immediately	intent	lawyer
fully	immunities	intercede	laying
functions	impartial	interesting	layovers
fund*(s*)	implied	internal	leagues
furnish(ing)	implies	interpret	learns
gain(ed)	importantly	interstate	leased
gentleman	imposed	intramural	leases
gifts	impossible	intrastate	leaves
giving	impression	introduce(d)	leaving
glue	improper	inventories	ledger
goes	incapacity	inventory*	legal*(ly)
goodbye	incidence	invert	legibly
goodness	included	invest(ed)	legislation
goods	includes	(igate) (ment*)	legislative
gotten	incomes	invisible	legitimate
governing	incorporate	invitation	lender
granted	increases	invite(d)	lending
grants	incurred	invoice(s)	lessee
grocer(y)	incurring	involve(s)	lesson(s)
gross*(es)	indicate(s)	involving	levied
grown	indirectly	irrevocable	liabilities
guarantee(s)	indispensable	issued	liability*
guard	inefficient	issues	liable*
guess	inevitably	issuing	license(d)
guilty	influenced	item*(s)	lifetime
handle	inherent	jobs	limit
happens	inherit	join(t*)	liquid(ation)
hearing	initial	journal	listed
heirs	initiative	judgment	listen(ing)
hence	injuries	July	listing
highest	injury	June	lists
hint	inquiring	juries	literally

ACCOUNT CLERK (continued)

literary	mess(ed)	notes	overdraw
litigation	minds	notice(s)	overhead
loan(ed)	minimum(s)	notifies	overtime
(ing)	minute	notify	owe(d)
located	misconduct	null	owned
location	misleading	numbering	owner(s*)
lodging	misnumbered	numerator(s)	(ship)
log	misrepresent	object(ion)	owning
logically	missed	(ive) (ives)	owns
lose	missing	obligated	o'clock
loss(es)	mixed	obligation	package
lowest	modification	observance	packaging
lucky	modified	obtain	packing
lumber	monthly*	occasional	page
machine	motive	occupation	paint
mail	mounting	offer*(ed)	papers
maintain(ed)	multiple	(ee) (or)	paragraph
(ing) (s*)	multiplication	officer(s)	pardon
majority	multiplied	offices	parent
managed	multiplies	official(s)	partial(ly*)
management	multiply(ing)	omission	participant
managerial	mutual	omits	participate
managers	named	operate(d)	parties
manifests	names	(s)	partner*(s*)
manual(ly)	necessarily	operating	(ship*)
manufacture	necessitate	operational	passbook
mark(ed)	necessity	operations	patrons
markdown(s)	negative	operators	payable
marketing	negligence	opposing	payer
markup(s)	neighborhood	opposite	paying
match(es)	net*	option	payment*(s*)
(ing)	nickel	oral	payroll*(s*)
materials	nine*	orders	pays
meant	nineteen	ordinarily	pending
meetings	ninety	ordinary	pension(s)
membership	ninth	ordinates	percent*(age*)
memo	noise	organize(d)	perform(ed)
memorial	non	organization*	(s) (er) (ing)
mental	nonexempt	original	periodic(al)
mentality	nonexistence	ostensible	periods
mentioned	nonprofit	otherwise	permanence
merchandise	noon	ounce	permanent
merchants	normally	outcome	permission
mere	notation(s)	outlined	permits
mergers	noted	outstanding	permitted

ACCOUNT CLERK (continued)

perpetual	preserved	purchase*(d*)	reducing
personally	presumed	(r) (s)	refer(red)
pertains	prevailing	purchasing	(s)
petition	prevent	purely	refund
petty	previous(ly)	purports	regard(ing)
philanthropist	prices	purposes*	(less)
phrase	pricing	pursuant	regional
physically	primarily	pursued	register(ed)
pick(ed)	primary	putting	registration
pieces	principal*(s)	qualification	regular(ly)
pink	principles	qualify	regulate(d)
places	prior	quantity	regulating
placing	privileges	quarter(ly*)	regulation
planned	procedure(s)	(s)	reimbursed
please	proceeds	questionable	reimbursement
pledging	processed	quick	reinstate
plenty	processing	quiz(zes)	rejection
plus	produce(d)	radios	related*
pockets	product	raffles	relating
pointed	proficiency	raise	relation(ship)
policies	profit*(able)	random	relative(ly)
portion	(ably) (s)	rapidly	relay
positive	project(ed)	rates	relevant
possibility	(ing) (ion) (s)	ratification	relief
post(ed)	promise(s)	ratified	remain(ing)
(s)	promising	ratify	(s)
potential	promissory	ratio	remedy
pound	promoter(s)	readily	remits
practice	promotes	reasonable*	remittance
preceding	promotional	reasonably	remitted
predominate	proof	receipt(s*)	remitting
preferred	proper(ly)	receivable	remodeled
prejudice	properties	receive(s*)	remunerating
premises	proposed	receiving	render
premium	proprietor*	recognize(d)	rental
prepaid	prospect(us)	recommend(ed)	renting
preparation	protected	reconciles	rents
prepare(d)	protection	recorded	reorganization
(s*)	protest	recorder	replied
preparing	proverbial	recording	reply
prepaying	provides	records	reporting
prerequisite	provision(s)	recover(y)	reports*
presence	prudent	recreation	represent(ative)
presentation	psychological	rectify	reputed
presented	punch	reduce(d)	request*(ed) (s*)

ACCOUNT CLERK (continued)

require(ment)	salaried	significant	stocks
(s)	salaries	similarly	store(s)
requiring	salary	simplest	strictly
requisition	sale*	sit	strip
resale	satisfy	situations	stronger
rescinded	Saturday	sixteen	structure(s)
resell	save(d) (r)	sixty	stub
reserve	saving(s)	skill(fully)	stuff
residence	schedule	(s)	style
resident	scientific	skipping	subchapter
resolving	scope	slow	subjects
resources	scrapped	sold*	submits
respective	secondary	sole	subscription
responsible	secret	solution	subsidiary
restrict(ed)	securities	solve	substantial
(ion) (s)	security	somebody	subtotal
resulting	sees	somehow	subtract(ed)
retail(ers)	seized	someone	(ing) (ion)
(ing) (s)	seldom	sometime	success(ful)
retained	select(ed)	sorry	sue(d)
retains	sell*(er)	sought	suffered
retention	(ing*) (s)	sounds	sufficient
retired	semimonthly	sources	suitable
retiring	send(s)	speaking	sum(s)
returns	separate*(ly)	specialize	summoned
revealing	seriously	specials	Sunday
revenue*(s*)	serves	specifically	sundries
reversals	settlement	specified	supermarket
reverse(d)	seventy	speed	supervision
reversing	share(d) (s)	spell(s)	supervisor
review(ed)	shareholder	spent	supplier
(s)	sharing	stable	supply(ing)
revolving	sheet*(s)	stack	supported
rid	shelves	standards	suppose(d)
rights	shift	stands	supreme
ring	shipments	stare	surfaced
risk(s)	shipped	starts	survey
role(s)	shipping	stated	sweater
rolls	shop(s)	statement(s*)	swimming
rooms	showing	stating	switch
round	shows	status	tabs
rule(s)	sign(ed)	statutes	takes
rulings	(ing)	stipulate(d)	talent(s)
rush	signals	stipulation	talked
safe	signature	stockholder*	talking

ACCOUNT CLERK (continued)

tangible	tonight	uniform	waived
tape	tons	unilateral	waking
tasks	tool	unions	walk
taxability	totally	unique	wants
taxable*	touch	units	warranty
taxation	tourist	unknowingly	watch
taxed	traded	unknown	wealth
taxes*	trade in	unless	wear
taxpayer	trailer	unlike	Wednesday
teach	transact(ion)	unnecessary	weekdays
technically	transfer(red)	unpaid	weekly
technique	(ring) (s)	unrelated	weight
telephone	transit	unused	weird
teller	transported	update	whenever
tells	transposing	useful	whereas
temporary	travel	uses	wherever
tenancy	tribes	utilities	whichever
tenant	truly	utilizes	wholly
tend(ed)	trust(ee)	valid	widely
(s)	(ees) (s)	valuable	willful
tentative	tryout	valuation	willing
term(ed)	Tuesday	valued	win
terminate(d)	tuition	variation	withdrawal
(s)	turning	varies	withdrawn
thank(s)	twelve	variety	withheld
thereafter	twenty*	vary	withholding
thereof	typically	verbal	won
thereon	unaffected	verdicts	wondering
thinks	unanimous	vertical	workers
thirteen	unanticipated	vested	worksheet(s)
thirtieth	unattracting	vinyl	worth(while)
thirty*	unchanged	violating	writer
thorough	unconstitutional	violation	writes
thousand(s)	underlying	virtually	yearly
threw	understand	void	yesterday
throw	undertake	voluntarily	yours
Thursday	undesirable	voting	yourself
tie	unemployment	voucher(s)	zero
timing	unenforceable	wages*	
tomorrow	unfilled	wait	

HIGH FREQUENCY WORDS AUTO MECHANIC

adjust(ing)	diagnosis	oil	servo
(ment)	diode(s)	operating	shaft
alternator	disassemble	output	shift
application	disconnect	owner	shock
armature	dispensing	panel	shop
assembly	dollars	pedal	solenoid
automatic	drive(n)	pin	spark
axle	driving	pinion	speed
battery	engage	plate(s)	starter
bearing(s)	engine	preload	station
bolt	fig.	primay	steering
brake	flows	printed	switch
breaker	fluid	procedure	teeth
brush	fork	properly	tension
cable	fully	pull	terminal
carrier	gear(s)	pump	throttle
certification	hose	pushrod	thrust
circuit	housing	receipt	tool
clip	identification	relay	torque
cluster	ignition	release	transaxle
clutch	indicator	removal	transmission
coil	inspection	remove(d)	unit
column	install(ation)	repair	vacuum
component	(ed)	replace	valve
connector	level	resistance	vehicle
converter	license	reverse	voltage
correct	loosen	ring	washer
cover	manual	screws	wear
current	motor	seat	wiper
customer	nut	secondary	wire
describe	official	selector	(s)

TECHNICAL VOCABULARY AUTO MECHANIC

absence	ammeter	automobile	blow(ing)
absolute	amounts	automotive	blueprint
absorbed	amp(s)	avoid	bodies
absorber(s)	amperage(s)	axle*	bolt*(ed)
abusing	amperes	backed	(s)
accelerate	anchor	backing	booklet
acceleration	angle	backs	boot
accelerator	announcement	backward	booth
acceptable	answering	backyard	bore
access	answers	ballast	bottom
accessories	antifreeze	band(s)	bought
accident(s)	anyway	bang	bowl
accompanies	apart	bar	box
accomplish	appears	basically	bracket
accumulator	appliance	bat	brake*(s)
accurately	applicable	batteries	braking
acid	applicant(s)	battery*	branch(es)
actions	application*	bay	brass
active	applied	bearing*(s)	breaker*(s)
acts	applies	beat	breathe
actuators	apply(ing)	becomes	brighter
adapted	appreciable	begin(ners)	broken
adapters	approaches	(s)	brush*(es)
add(ing)	approval	believes	bubble
(s)	approved	bell	buffer
additives	approximate	bellhousing	build
address	arm	belonging	buildup
adequate	armature	belt(s)	built
adjacent	arrange(d)	bench	bulb
adjust*(ed) (er)	(ment)	bending	bulk
(ing*) (ment*)	arrived	bendix	bureau
admitting	aside	besides	burn(ed)
advance	assemble(d)	bevel	(ing)
affect	assemblies	beware	burnishing
affixed	assembling	bezel(s)	burred
afford	assembly*	bias	bushing(s)
agent(s)	attach(ed)	bicycle	busy
airflow	(es) (ing)	biggest	butt
align(ed)	attacks	bind(ing)	button
(ment) (s)	attempt(ing)	bit	buy
allow(able)	attendant	bite	bypass
(ing) (s)	attract(ed)	blades	cable(s)
alternating	authorized	blank	calculated
alternator*	auto	blister	camshaft
aluminum	automatic*	block(ing)	cap

AUTO MECHANIC (continued)

carburetor	cloth(s)	considering	cowl
careful(ly)	cluster*	consist(s)	cracks
carpet	clutch*(es)	console	cranked
carrier*(s)	coast(ing)	constant(ly)	cranking
carry	coat	constitute	crankshaft
cash	cocked	construction	created
casing	coefficient	consult(ing)	critical
catch	coil*(s)	contact(or)	cross
caught	collapses	(s)	cruise
caused	collect	containing	crushed
causes	colors	contains	cup
causing	column*(s)	contingency	cupboards
caution	combines	continually	cure
centerpunch	combustion	continuation	current*
centrifugal	commission	continues	curved
certification*	commonly	continuity	cushion(ing)
certified	commutator	contractor	customer*(s)
chain	compare(d)	controlled	customizing
changing	comparison	controls	cycling
chapter(s)	compartment	convenient	cylinder(s)
charged	compensate	convention	damage(d)
charger	complaint(s)	convert(er*)	damping
charging	completed	(ers)	dart
chart	completing	coolant	dash
chassis	completion	cooler(s)	date
cheap	complicate	cooling	dealer
check(ed)	component*(s)	cooperation	dealing
(ing) (s)	composition	coordinate	deals
chemical	compress(ed) (es)	copper	decade
chipped	(ing) (ion) (or)	copy	deceleration
choke	concisely	core	decreases
circle	condensation	corporation	decreasing
circuit*(ry)	condenser	correct*(ed)	deduct(ible)
(s)	condition(ing)	(ing) (ly)	defective
circulate	conducted	correspond	defined
circumstance	conductor(s)	corroded	defines
clamp(ing)	conduit	corrosion	definite(ly)
claws	cone	cotton	deflection
clean(ed)	confuses	counterclockwise	deflector
(ing)	confusion	countershaft	delay
clearance	conical	counting	delicate
clevis	conjunction	couples	deliver(ed)
clip(s)	connect(ed)	coupling	(s)
closed	(ing) (ion)	courteous	demand
closes	connector*(s)	cover*(ed)(s)	demonstrated

AUTO MECHANIC (continued)

dented	display	efficiency	exchangers
dents	disposal	efficient(ly)	executive
depending	disposed	eight	exempt
depreciating	distort(ion)	elaborate	exerted
depress(ed)	distribute	elbow	exerting
(ing)	distributor	electric(al)	exhaust
depth	divide(d)	electrolyte	existing
describe*	dividing	electromagnet	expanding
describing	document	electronic	expensive
description	dollar(s*)	electrons	expire
designated	domestic(ally)	elemental	explain(ed)
destroy(ed)	doors	eliminate(d)	exposed
detach	doped	elite	extended
detail(s)	double	elsewhere	extending
deteriorate	downs	emerges	extends
determines	downshift	emission	extension
device(s)	downward	empty	exterior
diagnose(d)	dozen	enables	external(ly)
diagnosis*	drag(ing)	ends	extra
diagnostic	drain(ed)	energized	extreme
diagram	(ing)	energizes	eyebolt
dial	draw(ing)	energy	facilitate
diameter	(s)	engage*(d)	facilities
diaphragm	dressed	(ment) (s)	facing(s)
differentiate	drift	engine*(s)	factors
difficulty	drill	engineering	factory
dim	drip	ensure(s)	fail(s)
dings	drive*(n*)-	equal(ly)	(ure)
diode*(s*)	(r) (ers)	equip(ped)	fairly
dip	(s)	equivalent	familiar
dipstick	driveshaft	essentially	fan
directing	driving*	estimate(s)	farther
directs	drop(ped)	estimating	fast(ened)
dirt(y)	(s)	etc.	(er)
disassemble*	drum	event(s)	fatal
disc(s)	dry	(ually)	faulty
discharge	duct	everybody	fee(s)
disconnect*	dust	everyday	fenders
discussed	dustfree	exact(ly)	fields
discussing	dynamic	examination	fifteen
disengaged	earliest	examine	fifty
disk	easier	exceed(ing)	fig.*
dispatcher	easiest	exception	figuring
dispense	economy	excess(ive)	file(d)
dispensing*	edge	(ively)	fill(ed)

AUTO MECHANIC (continued)

film	functions	harmful	improper
filter	furnished	harness(es)	improved
findings	fuse(d)	hatchback	inability
finger	(s)	hazard	inch(es)
finished	fusible	heading	includes
firewall	gain(ed)	hearing	incoming
firing	gallons	heat(er)	incorporate
firmly	gap	heavier	incorrect
fit(s)	garden	heavy duty	increasing
(ted)	gas(es)	height	independent
fixed	(sing)	helical	index
fixture	gasket	herein	indicate(s)
flange	gasoline	hesitant	indicating
flat(s)	gauge	highways	indication
flip	gear*(ing)	hoist	indicator*
float(ing)	(s*)	holder	induced
floorboard	gearset	holding	induction
flow(s*)	generalities	holds	inductive
fluid*(s)	generates	hole(s)	initiate
flush(ed)	giving	hood(s)	injure
(es) (ing)	glasses	hook(ed)	in line
flux	glimpses	horn	inner
fly	governor	hose*(s)	inoperative
flywheel	grabbing	housing*	input
fog	gravity	hub	insecticide
follow(s)	grease	hydraulic	insert(ed)
follow up	grind	hydrogen	(ing)
foreman	gripping	hydrometer	inspect(ed)
fork*(ed)	groove(s)	ideal	(ion*) (or) (ors)
formed	gross	identical	install*(ation*)
forth	grounded	identification	(ed) (ing)
forty	groundwire	identified	instruct(ion)
forwarded	grouped	identify(ing)	instrument
fraction	guess	idler	insulate
frame	guesswork	ignition*(s)	insulating
freely	guide	illuminate	insulation
freewheel(ing)	halfway	illustrate	insulator
freezing	hamper	illustration	insurance
frequency	handbook	imagine	intake
fresh	handle(s)	immediately	integral
friction	handy	immerse	intended
frontwheel	happen(ing)	impeller	interchange
fuel(s)	(s)	implementing	intercom
fully*	harden	imported	intermediate
functioning	harder	impossibility	internal

AUTO MECHANIC (continued)

intervals	leads	lubricant(s)	minor
intricate	leakage	lubricate(d)	minute
introduced	leaking	lubricating	miracle(s)
introduction	leaks	lubrication	mirror(s)
invalid	learn	tug(ging)	missing
inventory	leaves	(s)	mix(ed)
investigation	leaving	lunch	(es)
investment	lengths	machine	mm
invisible	lets	magazine	model(s)
involved	letting	magnet(ic)	mode(s)
isolate	lever*(s)	(s)	modification
isolation	leverage	mainshaft	modified
issued	license*(d)	maintain(ed)	modular
items	(s)	(ing)	modulator
jam	licensing	maintenance	module(s)
jamb	lift	maker	moistened
jammed	lightening	manager	molded
jet	lightly	manifold	molecules
jobs	lights	manual*(ly)	motion
join	lightweight	(s)	motor*(s)
joints	likewise	manufacture	motorcraft
joy(s)	limited	mark(ed)	mount(ed)
jumper	link(age)	(ings) (s)	(ing)
junction	(s)	master	mouth
junk	lint	match	movable
keeps	listed	materially	moves
kerosene	lists	materials	muffler
key(s)	load(ed)	mathematics	multiplication
kick	(s)	matters	names
kill	locate(d)	maximum	nationally
kilometers	locating	meaningful	neatly
kinds	location(s)	measure(d)	necessarily
kit(s)	lock(ed)	(ment)	needing
knob(s)	(s)	measuring	needle(s)
knocked	locknut	mechanic(al)	negative
knocking	lockup	(s)	neighborhood
lab	loose	mechanism(s)	nervous
lacks	loosen*(ed)	melt(ed)	neutral
lamp	(ing)	(s)	nine
latch(es)	loss	mesh(ed)	ninety
lathe	lots	messed	noise(s)
launching	lowered	metal	noisy
lawn	lowering	meter	normally
lbs.	lowers	mile	notch
leading	lowest	mileage	notebook

AUTO MECHANIC (continued)

notice(d)	pad	pliers	product
notification	page(s)	plug(s)	profitable
notifying	pain	plunger	profit sharing
noting	paint(ing)	pockets	project
nozzle	(s)	pointer	prompt(ly)
nut*(s)	pair(s)	polarity	proper(ly*)
nylon	pan	polish(ed)	protect(ive)
obtaining	panel*	portion	(s)
occur(red)	pants	positioned	protrudes
(s)	parabolic	positioning	protruding
odometer	paragraphs	positions	provides
offer(s)	parallel	positive(ly)	providing
officer(s)	park(ed)	possession	pry
official	(ing)	possibility	psi
ohmmeter	pass(age)	possibly	publish(ed)
oil*(s)	(ages) (es)	post	pull*(ed)
older	path	pound(s)	(ey) (ing)
opening(s)	patterns	pour	pulse
operate(d)	payroll	powered	pump*(ed)
(s)	pedal*	preceding	(er) (s)
operating*	perform	preferable	punch
operations	periodical	preinspect	purchase(r)
operator	permanent	preliminary	purposely
opinion	permit(s)	preload*(ed)	pursuant
opposing	(ting)	preparation	push(es)
opposite	petition(er)	prepare(d)	(ing)
option(al)	phrase(s)	presented	pushrod*
orders	pick(er)	presized	puts
ordinarily	pieces	pressed	putting
ordinary	pin*	presses	quadrant
origin	pinion*(s)	pressing	qualified
original(ly)	pink	pressure	qualify
otherwise	pinned	pretty	qualities
outer	pins	prevent	quarter
outlining	pipes	previously	quick(er)
output*	piston(s)	primary*	(ly)
overdrive	pitch(ed)	principles	quiet
overfilling	pivot	printed*	quote
overhaul(s)	places	prior	race
overrevving	placing	prix	racing
override	planet	probe(s)	rag
overrunning	planetary	procedure*(s)	raise
owing	plastic	proceed	rapidly
owner*(s)	plate*(s*)	produce(d)	rated
oxygen	pleasant	(s)	ratings

AUTO MECHANIC (continued)

ratio(s)	relay*	retaining	seatbelt
rattles	release*(d)	retard	secondary*
rattling	releasing	returns	sections
reach(es)	remain(der)	reverse*	secure(d)
react(s)	(ing) (s)	review(ed)	(ly)
readily	reminder	rheostat	securing
readiness	remote(ly)	ridge	seeing
readjust	removal*	riding	sees
reaming	remove*(d*)	rigor	seizing
rear	removing	rim	select(ing)
rearward	render	ring*(s)	(ive) (or*)
reasonable	renew	rivet	self
reasonably	rent	rod	sell
reasons	repainting	roll	send(ing)
reassemble	repair*(ing)	roller(s)	sentence(s)
reassembly	(s)	rotate(s)	separate(ly)
rebuilt	repeat(ed)	rotating	sequence
receipt*	repel	rotor(s)	seriously
receive(s)	replace*(d)	round	serve(s)
recommend(ation)	(ment)	row	serviced
(ing) (s)	replacing	rpm	servicing
reconnect(ed)	reportable	rubber	servo*(s)
recorder	reposition	rubble	setscrew
rectifier	representation	ruin	setting
recurrence	reprogramming	rule(s)	settle
redone	request(ing)	rumble	severe
reduce(s)	(s)	runner	shaft*(s)
reducing	require(ment)	runout	sheet
reduction	(s)	runs	shelves
reface	requiring	sacrificing	shield(s)
refer	reread	safety	shift*(ed)
refinement	resembles	sale	(er) (ing) (s)
reform	reservices	salesman(ship)	shock*
refund	reservoir	salesroom	shooting
regard(less)	resin	sample	shop*(s)
registered	resist(ance*)	satisfied	shorted
registration	(or)	save	shorten
regular	resoldering	scale	shoulder
regulator(s)	response	schematic	showing
reinforcement	responsible	scientific	shows
reinspected	resting	score	shunt
reinstall(ation)	rests	screw(s*)	shut
(ed) (ing)	resulting	screwdriver	sideplay
rejected	retained	seal	sides
related	retainer	seat*(ed)(s)	sign(ed)

AUTO MECHANIC (continued)

simplicity	specification	strut(s)	tested
simplify	specifics	stuck	tester
simultaneously	speed*(s)	stud	testing
sits	speedometer	studies	tests
sixty	spillage	stuff	thank(s)
sizes	spilled	stupid	thereof
skills	spinning	sufficient	thick(ness)
slack	spiral	suitable	(es)
slammed	splined	sulfuric	thin(ner)
sleeve	splines	sum	thirty
slid	split	superceded	thorough(ly)
slide	spoke	superintend*	thousand
slightest	springs	supplied	thread(ed)
slightly	sprocket(s)	supply	(s)
slip(page)	spun	suppression	throttle*
(pery)	squeezed	surfaces	throw
slipping	squirting	surges	thrust*
slot(s)	stages	surprised	thicket
(ted)	stainless	suspect	tighten(s)
slower	stamped	suspension	tightly
sludge	stands	swelled	till
smaller	starter*	switch*(ing)	tilt(ed)
smallest	starting	symbols	timely
smooth(ly)	starts	symptom(s)	timing
snap	station*(s)	synchronize	tip(s)
snow	stationary	tab(bed)	tire
snugly	stator	(s)	title
soaked	steady	tackle	toe
socket(s)	steam	tail	tool*(s)
sold	steel	tailored	toploader
solder(ing)	steering*	takes	tor
solenoid*(s)	stem	talked	torque*
solid	sticker	talking	touch(ed)
solution	stirring	tangs	(ing)
solvent	stops	tank	tougher
somehow	storage	tape	toward
someone	storeroom	tape	tower
somewhere	straighten(ed)	teardown	towing
sounding	strand	technician	trace(s)
source(s)	strap	technology	track
spaced	strictly	teeth*	trailer
spacer	strip	tend(ency)	train(s)
sparingly	stroke(s)	tension*	transaxle*
spark*	strongly	term(inal*)	transfer(red)
specifically	struck	(inals)	transforms

AUTO MECHANIC (continued)

transistor	underneath	version	whenever
transmission	unhook	vertical	whereas
transmits	uniform	vibration	wherever
travel	unique	viewed	whoever
treat(ed)	unit*(s)	virtue	wiggles
trend	unitized	viscosity	winding(s)
trick	unkown	vise	windshield
triggering	unlawful	volt(age*)	wipe(d)
trim	unless	wagons	(r*)
troubles	unlike	wait	wire*(s*)
truck	unlimited	wander	wiring
trunks	unsolder	wants	wise
tuneup	updated	ward(s)	withdraw
turbine	upper	warn(er)	(n)
turbo	upright	(ing)	withstand
turning	unshift	warped	wonder(ing)
turns	uses	warranty	workbench
twelve	utmost	wash(ed)	workshop
twenty	vacuum*	(er*) (ers)	worn(out)
twisted	valid	watch	worry
twisting	validity	waved	worth
twitch	valve*(s)	wax	wrap
typical	vanes	weak(ened)	wrench
unavailable	variable	wear*(ing)	yellow
unbolted	vary(ing)	(s)	yoke
uncovering	vaseline	weighed	yours
undergoing	vehicle*(s)	wet	zero
undergone	venerable	wheel(s)	zinc

HIGH FREQUENCY WORDS DRAFTSMAN

ac	equal	joint(s)	specified
all right	exterior	layout	steel
base	feature(s)	location	tension
bean	fifty	manufacture	thickness
brick	fig.	materials	tolerance
buildings	foot	metal	twelve
component	foundation	object	twenty
concrete	ft.	openings	vertical
connection	grid	panel(s)	vessel
construction	harness	parallel	(s)
diameter	heads	pipe	walls
dimension(s)	heat	plate	weld(ed)
draw(ing)	horizontal	radiograph	(s)
(ings) (n)	inch(es)	requirement	wire(s)
eight	inspection	sheet	wiring
elevation	intersection	specification	wood

TECHNICAL VOCABULARY DRAFTSMAN

ability	affect	arches	base*(s)
abrasion	affixed	architect(s)	baseball
abreast	aircraft	(ure)	baseboards
absence	airspeed	arm	basically
absorption	album(s)	arranged	basketball
abutting	aligned	arrangement	batch
ac*	alignment	arrived	battery
accelerate	all	arriving	bay
acceleration	allocated	arrow	beam*(s)
acceptability	allocation	artistry	beans
acceptable	allow(able)	artwork	bear(able)
acceptance	(ance) (ances)	aside	beat(s)
accepted	alloy	assembly	becomes
access	alteration	assignment	beforehand
accommodate	alternative	assistants	beg
accomplish	altitude	assume(d)	begin
accordance	aluminum	assuming	bell
accumulating	amended	assumption	bellmouth
accuracy*	amendment	assurance	bench
accurate	amounts	atmospheric	bend(ing)
achieved	anchor(s)	attach(ed)	beneath
achieving	angle(d)	(ment)	beneficial
acoustical	(s)	attain	besides
acquaintance	angular(ity)	attempted	bet
acquainted	annex	attics	bevel(ed)
acquire	annular	auction	beware
acted	answers	automated	bilateral
acting	apart	automatic	binders
acts	apiece	automation	binding
actual	apparatus	avoid	bisect(ing)
ad	appearance	await	(ors)
adaptable	appendices	awake	bit
add(ing)	appendix	aware	blade
(s)	applicable	awful	blasted
address(er)	application	axes	block(ing)
(es)	applies	axis	(s)
adequate(ly)	apply(ing)	background	blow(s)
adhesive	appreciate	backing	boards
adjacent	appropriate	backup	boiler(s)
adjustment	approved	bacterial	bolted
admission	approximate	balloon	bolts
adopt(ed)	arbitrarily	bank	bond
advantage(s)	arbitrary	bar	books
advent	arc	barely	boom
aesthetic	arched	barrier	bosses

DRAFTSMAN (continued)

bottom	cape	check(ing)	comparative
boundary	capital	cheek	comparison
bow	carbon	chimney	compass
bowls	career	choose	compensation
boxes	careful(ly)	chose	competent
braced	carpenters	chutes	completed
braces	carport	circle(s)	completing
bracing	carrier	circuit(ry)	completion
branch(es)	carry(ing)	circular	complex
breadth	Cartesian	circumference	complicate
break(ing)	cash	civil	compliment
(s)	casings	clad	comply(ing)
breeching	cast(s)	clamped	component*(s)
brick*(ed)	cataloged	clamps	composed
(s)	catalogs	classification	composition
bridge	catch	classified	compressed
brief(ly)	categories	clay	compression
broad	category	clean(ed)	computation
break	caulking	(ing)	computed
build(er)	caused	clearance(s)	conclave
(ers) (ings*)	causes	client	concealed
built	causing	clip	concentrate
bulkheads	cavity	closely	concentric
bundle	cedar	closest	concept
burn	ceiling(s)	closing	concern(ing)
busy	celebrating	closure	concrete*
butt	centers	cm	concurrent
button	centimeter	coal	condensate
buy	centroid(s)	coast	condensation
bye	centuries	coat	condition
cabinet	certificate	coaxiality	conductor(s)
cable	cesspool	code(s)	cone(s)
cages	chair	coffee	confidence
calculate(d)	chalk	coincided	confines
(s)	challenge	coke	conflict
calculating	challenging	collective	conform
calculation	chambers	colonial	confusion
calculus	chances	colors	conical
calling	changed	columns	conjunction
canceled	channel	combination	connect(ed)
cancels	chap	combustible	(ing) (ion*) (ors)
cantilever	chapter(s)	combustion	conservation
capable	characteristics	commercial	considerate
capacities	charts	commonly	consist(ent)
capacity	chassis	communicate	(s)

DRAFTSMAN (continued)

constant(ly)	couplings	debris	diagonal(ly)
constituent	courses	deceleration	diagram(s)
constructed	cousin	decent	diameter*(s)
construction	cover(age)	decimal(ly)	die
consultation	(ing) (ings) (s)	deck	differ(s)
consults	cracking	decoration	difficulties
contact(ed)	cracklike	defects	difficulty
(s)	cracks	define(s)	dim
contain(ed)	crane(s)	defied	dimension*(ed)
(s)	create(d)	defining	(ing) (s*)
contemporary	(s)	definitely	dinner
continuous	creativity	definition	directed
contour(ed)	crimp	deflection	directions
(s)	criteria	deform	director
contraction	critical	degrees	discharge
contractor	cross(ing)	delineated	discuss(ed)
contrasting	crossline	deliver(y)	disposal
contribute	cross section	denominator	disposed
controlled	crosswalks	denotes	distances
controlling	crowbars	density	distinguish
controls	crown	depend(ing)	disturbing
convenient	crunch	deposit	diver
convention	cube	depression	divide(d)
conversation	cubic	depth	dividing
conversion	curbs	derived	divisions
convert	currently	describe	document
cool(ing)	curtain	description	dollars
coordinate	curve(d)	descriptive	domestic
coordination	custom(ary)	designate(d)	doorknob
cope	cuts	designation	dot(ted)
copies	cutting	designer(s)	double
copper	cycle	designing	doubts
copy	cylinder(s)	designs	downstairs
cord	cylindrical	desirable	downtown
cores	damage(d)	desired	downward
corners	dampened	desk	draft(ing)
cornice	dash	destruction	draftsman
correct(ly)	date(s)	detail(ed)	drain(age)
correspond	datum	(s)	(s)
corridor	daytime	detergents	draw*(ing*)
corrosion	dc	determining	(ings*) (n*)
corrosive	dealer	develop(ing)	dress
cosign	dealing	device(s)	drilled
counseling	deals	devoted	drinks
counselors	debated	dew	drippings

DRAFTSMAN (continued)

driven	employees	exception(s)	favor(ites)
driver	emptied	exchange	feasible
drives	empty	excluded	feature*(s*)
driveways	enclose(d)	excuse	February
driving	enclosure(s)	exempted	feeder
drop(ped)	encountered	exercise(s)	fewer
(s)	ending	exert(s)	fiber
drove	ends	exhaustive	fields
dry	energy	exist	fifteen(th)
duct(s)	engineer(ing)	exit(s)	fifth(s)
ductwork	enjoyed	expanded	fifty*
dug	ensure	expanse	fig.*
dumbwaiter	entail(s)	expansion	figh(s)
durable	entering	expensive	figured
dusting	enters	explain(ed)	figuring
dwelling	enthusiasm	(s)	file(d)
dynamic(s)	entirely	explanatory	(s)
easier	entrance	exposed	filled
eating	environment	expressed	fillet
eaves	equal*(ly)	expressing	finding
eccentric	(s)	extend	fingers
economical	equation(s)	(ing)	finish(ed)
economy	equilibrium	extension	(ing)
edge	equipped	exterior*	firebrick
editions	equivalent	external	fireplace
effectively	erase	extinguish	firmly
efficiency	erect(ing)	extra	fit(s)
effluent	(ion)	extreme	fitting(s)
eight*	erosion	eyelets	fixed
eighteen	escalator(s)	fabricated	fixtures
eighty	essential	fabrication	flame
elaborate	establish(ing)	facing	flammability
elbow(s)	estimate(s)	factor	flange(d)
electrical	etc.	failure	(s)
electronic	evenly	fairly	flashing
elevation*(s)	event(ually)	falling	flat
eleven	(s)	falls	flight
eliminate(s)	evolved	false	flooring
ellipse	exact(ing)	familiar	floors
elliptical	(ly) (ness)	fan(ned)	flow
elongation	exam(ination)	fancy	flue
embedded	(ined)	fantastic	flush
emphasis	examples	farmer	flux
emphasized	excavation	fasten(ed)	fly
employed	exceed(ing) (s)	(ing)	foam

DRAFTSMAN (continued)

folder	galvanized	hardware	improve
folding	games	harness*	inaccurate
follow(s)	gap	haul	inch*(es*)
foot*(ing)	gas(eous)	headers	inclined
foregoing	(es) (sed)	heads*	included
foreshorten	gauge(s)	hearth	inclusive
forged	gear	heat*(ed)	incomplete
forget	generated	(er) (ers) (ing)	inconsistent
forging	gently	heaviest	incorrectly
format	geometric(al)	heel	increases
formed	gets	height	increasing
formerly	girders	hereof	increment
forming	giving	hereunder	incurred
formula(s)	glass	hidden	indentation
forth	goal	highly	independent
forty	goes	holdage	indicate(s)
foundation*	gold	holders	indicating
fourteen	gotten	holding	indication
fourth(s)	govern(ing)	hole(s)	indicator
foyer	(s)	homes	indirectly
fractions	grade	homework	inertia
frame(s)	graduates	hook	inherent
framing	graphical	hopefully	initial
fraternal	gravel	horizon	inner
freebody	gravity	horizontal*	inspection*
freed	grid*	houses	inspector
freehand	grooves	housing	installation
freely	grout	hub(s)	installed
frequently	guarded	hungry	instances
friction	guess	hurt	institute
Friday	guide(s)	hydraulic	institution
fronting	guys	hypotenuse	instruction
ft.*	gypsum	identical	instructor
fully	gyration	identification	instrument
fun	hallway	identified	insulating
fundamental	hammer	identify(ing)	insulation
funny	handbook	illustrate	insurance
furnished	handed	illustration	integrally
furniture	handhole(s)	impact	intended
fur(red)	handicap	impending	intent(ional)
(ring)	handle	implies	interboard
fusion	handrails	implying	interconnect
gable(s)	hang	impossible	interesting
gaging	happen(s)	impractical	interests
gallon(s)	happy	impression	interfere(nce)

DRAFTSMAN (continued)

interfering	lands	load bearing	mechanical
interior(s)	lap(ped)	locate(d)	mechanism
intermediate	(s)	locating	medium
internal	largely	location*(s)	meets
interpretation	lath	lock(ing)	mental(ly)
interpreted	laundry	logical	merits
interpreting	layer	longitudinal	mesh
interrelated	laying	looks	message
intersect(ed)	layout*(s)	loosened	metal*
(ion*)	lb.	looseness	meter(ing)
interval(s)	leading	lose	(s)
introduced	leads	losing	metric
introduces	leaked	losses	mile
inventory	leaking	lowest	millimeter
irregular	lease	lucky	mineral
isolated	leaves	lumber	miniaturize
isolation	leaving	lunch	minimize
items	ledger	lyrics	minimum
jams	ledges	machine(d)	minus
jobs	leg(s)	(ry) (s)	minute
join(ed)	lengths	magnetic	miter(s)
(ing)	lesser	magnifies	mm
joint*(ed)	leveled	magnitude	modification
(s*)	levels	magnolia	modular
joist(s)	liability	mail	module
judging	librarian	mainly	moisture
jumper	libraries	maintain(ed)	moldings
jumps	library	(s)	molds
justification	lieu	manhole	moments
keeping	lift(ing)	manhours	Monday
keeps	lights	manpower	monetary
key	liked	manufacture*	moon
kg	limit(ing) (s)	mark(ing)	moreover
kilograms	linear	masonry	mornings
kit	lined	master	mortar
kitchen	liner(s)	matching	motion
knocking	lining(s)	materials	motivated
knows	lip	math	mountains
labeled	liquid	mating	mounted
laboratories	listed	matrix	mounts
laborers	listen(ing)	maximum	movable
lacking	lists	meanings	mph
laid	lives	measure(d)	mud
landed	load(ed)	(ment) (s)	multiple
landing	(ing) (s)	measuring	multiplied

DRAFTSMAN (continued)

multiply(ing)	occupied	papers	pit
mutual	occur	parachute	places
nail(ed)	octagon	paragraph(s)	placing
(ing) (s)	offering	parallel*	plain
naturally	offices	pardon	planer(s)
nearby	official	partially	planes
nearest	offset(s)	particle	planned
neat(ly)	(ting)	parties	plaster
necessarily	ogee	partition(s)	plastic(s)
necessitate	oil	partly	plate*(d)
necessity	ok	pass(es)	(s)
neck(s)	omitted	(ing)	platforms
negative	onto	patched	plated
neglecting	opening(s*)	path(s)	playing
negligible	opens	patio	plot(ted)
net	operable	patterns	(ting)
newtons	operate	penalties	plug(ged)
nice	operations	penetrant	plumb(ed)
nine	operator	penetration	(ing)
nineteen	opposed	penthouses	plus
ninety	opposes	percent(age)	plywood
nobody	opposing	perforated	printing
noise	opposite	performed	policies
nominal	ordered	performing	popular
noncombustible	organized	perimeter	porcelain
noncomplex	original	permanent	porch
noncorrosive	otherwise	permissible	port(able)
normally	ought	permit(s)	portion(s)
notch(ed)	outer	(ted)	posed
noted	outlet(s)	perpendicular	positional
notes	outline(d)	personnel	positioned
notice(able)	output	perspective	positions
nozzle(s)	overall	pertain(ing)	positive
numbered	overhang(s)	physically	possibility
numerators	overhead	pi	possibly
numerical	overlap(ping)	pick(ed)	postal
object*(s)	overtaken	(ing) (s)	potential
objectionable	overwork	pictorial	pounds
obstruction	owner	pieces	poured
obtain	pack(age)	pier(s)	practical
obvious	page(s)	pigtail	practice(s)
occasion	pain	pinned	precedence
occupancies	painted	pins	precipitate
occupancy	panel*(ing)	pipe*(s)	precisely
occupant(s)	(ized) (s*)	pipng	precision

DRAFTSMAN (continued)

predetermine	prove(d)	reduce(d)	respects
predrilled	(n)	reduction	restricted
preferably	provides	redwood	restrooms
preferred	providing	refastened	rests
preheating	provision(s)	refer(red)	resulting
preliminary	psi	(ring)	retaining
preparation	pull(ed)	reference(d)	retardant
prepared	pulse	regardless	reveal(ing)
preparing	punched	registered	reverse
preplan	purchase	registrars	review
prescribed	purposes	regular	rewards
present day	pursued	reinforced	rig
presents	pushed	reinforcement	right
pressing	putting	reinforcing	ring(s)
pressures	quadrant(s)	relate(d)	ripped
prevailing	quantities	relation(ship)	rise
prevent(s)	quantity	relative(s)	roads
previous	quarter(s)	release(d)	rocks
prices	quick(er)	(s)	rod
primarily	(ly)	reliable	rolled
principles	radiant	remain(ing)	roof(s)
printed	radiograph*	remodeling	rooms
printing	radius	removable	root
prints	rails	remove(d)	rope
prior	raised	removing	rough
procedures	ramp	repair(ed)	round(ed)
proceed	ramset	(s)	rule(s)
processes	random	replaced	runs
processing	rapid	represent(ed)	safe(ty)
produce(d) (s)	rates	(s)	salvaged
product	rating	requesting	salvation
proficient	raw	require(ment*)	sample
profile(s)	reactions	(s)	satellite
progresses	readily	requiring	satisfactory
prohibit	realistic	requisition	satisfied
project(ed)	realize	resembling	Saturday
(ing) (ion)	reasonable	reserved	scale
promised	reasons	reserves	scaling
proof	rebound	reservoir(s)	schedule(d)
proper(ly)	recessed	residence(s)	schematics
proportion	recommended	residential	scissors
propose	recorded	resistance	scratch
prospective	rectangle(s)	resistive	screen
protect(ed)	rectangular	resolve	screws
(ion)	redesign	respective	scribed

DRAFTSMAN (continued)

script	shift(s)	slightly	staggered
sealed	shingles	slipped	stainless
sealer	ship(ment)	slope(s)	stairways
seam	shoot	slots	stamped
searching	shop	slow	standards
seated	shorted	slug	standing
seating	shortest	smaller	standpoint
secondary	should	smoke(y)	starter(s)
seconds	showcases	smooth(ly)	starting
sectional(s)	showing	snap(ped)	starts
sections	shows	socket	stated
secured	shrink	soil	static(s)
securely	sides	sold	stating
securing	sidewalk(s)	solder	stationery
seep(age)	siding	solid	statistics
seldom	signal(s)	solution	stays
selected	significant	solve(d)	steam
selecting	signify	solving	steel*
selection	sill(s)	sooner	steep
self	similarly	source(s)	stenograph
selling	simplest	spaced	stepping
semicircle	simplification	spaces	stick(ing)
semidiameter	simultaneous	spacing	stiffen
send	singing	span	stocked
separate(d)	singular	spandrels	stone
separation	sit(ting)	spec	stopper
septic	site	specialize	stops
serves	situations	specifically	storage
serving	sixteen(th)	specification*	store(s)
setting	sixth	specified*	storm
settling	sized	specify(ing)	strap(s)
seventy	sizes	specimen(s)	streets
sewage	sizing	spell	strengths
sewer	sketch(ed)	spend	stresses
shade	(es) (ing)	spherical	stretch
shadow(s)	skids	spiral	strike
shaft(s)	skilled	short	striking
shakes	sky	spot(ting)	strings
shape(d)	skylights	spread	strip(ped)
(s)	slab(s)	sprinklers	(s)
sheet*(ing)	slanted	squared	struck
(s)	sledge	squares	structural
shell(ed)	sleeper	squaring	structure(s)
(s)	sleeping	stability	studies
shield	slide(rs)	stable	stuff

DRAFTSMAN (continued)

style	tally	throw(s)	truss(es)
sub	tamped	thorough	tube(s)
subcontract	tangent	thumbnail	tubing
subdivision	tank(s)	Thursday	tune
subgrade	tape(d)	tie(d)	twelve*
subjected	taper(ed)	(s)	twenty*
subjects	(ing) (s)	tighten	twice
subparagraph	target	tightly	twisted
subsection	task	tightness	twisting
subsequent	team	tile	typical
substances	techniques	till	ultrasonic
substantial	tee(s)	timber	unacceptable
substitute	telephone	tiny	unacquainted
substituting	temporarily	tip(ping)	unbalanced
successful	temporary	title	unbearable
sufficient	tenant	toe	uncle
suggest(ion)	tend(s)	toilet	uncontrolled
suitable	tensile	tolerance*(s)	undercarriage
sum	tension*	tomorrow	undermining
supervisor	tentative	tons	underneath
supper	tenth	tool(ed)	undimensioned
supplement	term	toted	unenclosed
suppliers	terminal(s)	touchup	uneven
supply	terminate(s)	trace(d)	unfired
supported	termination	tracing	unforseeable
suppose(d)	testing	tracks	unified
surfaces	tests	trades	uniform(ly)
surprised	text(s)	traditional	unilateral
surrounded	textural	traffic	unit(s)
surrounding	texture(s)	trailer(s)	unknown(s)
surveying	theorem	trained	unless
suspended	theoretical	transfer	unloading
switch	thereby	transition	unnecessary
symbol(s)	therein	transportation	unproductive
symmetrical	thereof	transverse	unprotected
symmetry	thereto	trapezoid	unstayed
tables	thick(er)	traveling	unsupported
tabs	(ness*) (nesses)	treated	unusual(ly)
tack welding	thinner	treatments	unwieldly
tag	thirteen	trench(es)	upper
tail	thirty	trend	upset
takeoff	thorough(ly)	triangle(s)	upward
takes	thousand	triangulate	usable
talked	thread(ed)	trim(mers)	useful
talking	throat	truck(s)	usual

DRAFTSMAN (continued)

vacation	vitreous	weight(s)	withstand
valley	vitrified	weld*(ed*)	won
vanish(es)	void	(er) (ing)	wonder
(ing)	volts	(s*)	wood*
vaporizer	volumes	wheeler	wool
variables	wainscoting	wheeling	worker
variation(s)	wait	whereas	(s)
variety	wales	wherever	workmanship
vary(ing)	walk	whoever	worksheet
vault(s)	wallboard	widely	worry
vector(s)	walls*	wider	worse
velocity	wants	width(s)	wrap(per)
veneer(s)	warrant	win	wrecked
vents	waster	wind	wrench
verge	wasted	windlift	yards
verify	wastes	windows	yell
vertical*(ly)	wedge	windstorm	yellow
vessel*(s*)	weekend	winter	yesterday
violation	weighed	wire*(s*)	zero
virtual	weighs	wiring*	zone

HIGH FREQUENCY WORDS ELECTRICIAN

accordance	connect(ed)	iron	relay
approved	contract(or)	jumper	resistance
article	core	liquid	resistor
axis	crisis	load	sizes
bar	electric(al)	locations	solution
behavior	equation(s)	magnetic	specification
box(es)	etc.	materials	specified
cable	feeder	metal	terminal(s)
charges	fixture	meter	thousand
circuit(s)	flexible	motor	unknown
code	graph	ohms	volt(age)
coil	grounded	outlet	(ages) (s)
conductor(s)	grounding	permitted	wire
conduit	installation	rating	wiring

TECHNICAL VOCABULARY ELECTRICIAN

abilities	alteration	attached	blowing
ability	altered	attachment	bodies
abnormal	alternate	attaining	bond(ed)
absence	alternating	attempt	(ing)
acceptable	altitude	attendant	books
acceptance	aluminum	attitudes	boom
accepting	ambient	attributed	boring
access(ible)	amendatory	authority	bottle
accident(s)	amp	automated	bottom
accompanying	ampacity	automatic(ally)	bounced
accomplish	ampere(s)	automobile	bows
accordance*	amplifier(s)	avenue	box*(es*)
accumulating	analyze	avoid	braced
accuracy	angle(s)	axes	brain(s)
accurate(ly)	annunciator	axial	brainstorm
achieve(d)	anticipate	axis	brake
(ment)	antimony	balance	branch(es)
activated	apathetic	ballast(s)	break(er)
actual	apparatus	bands	(ing) (s)
actuate	appliance(s)	bar*(s)	bringing
additions	applicable	bare	brings
adequacy	application	barrier	brother
adequate	applies	base(ments)	built
adhesive	apply	battery	burn(ed)
adjacent	apprentice	bear	bus
adjusted	approached	beating	bushing(s)
adjusting	appropriate	becomes	butterfly
adjustment	approved*	begins	buy(er)
admired	approximate	behavior	(ing)
adult(s)	architect(s)	beings	buzz
advanced	(ure)	bell	cab
advice	arise	bench	cabinet(s)
affect(ed)	arithmetic	bet	cable*(s)
(s)	arm	bias	calculate(d)
affixed	armature	bid(der)	calculation
afterward	arranged	(ders) (ding)	calculator
agency	arrangement	bigger	calibrated
aggregate	arrow	biggest	calibration
air conditioning	article*(s)	biological	calls
alarm(s)	assembled	bipolar	canceling
algebraic	assemblies	bismuth	canopies
allow(ing)	assembly	bit	capacities
(s)	assistance	blade	capacitive
alloys	associate(d)	blanked	capacitor
alnico	atoms	block(s)	careful(ly)

ELECTRICIAN (continued)

carriers	clean(ed)	condition(ing)	correlation
carries	(ing)	conduct(ion)	correspond
carry(ing)	cleared	(or*) (ors*)	corrosion
cast	climates	conductive	costly
catalog	climb	conduit*(s)	counting
catatonic	closely	confidence	coupling
category	closer	conflict	courses
caused	closures	conform	cover(s)
causes	clothed	confused	crescent
causing	cobalt	connect*(ed*)	crises
ceiling(s)	code*(s)	(ion) (s)	crisis*
Celcius	coefficient	considerable	crisscross
cemented	coil*(ed)	considerate	critical
cementing	(s)	considering	cross
centers	collector	considers	crowd(ed)
chair	collision	consist(ent)	crystal
chalk	columns	(ing) (s)	curie
chances	comb	constant(s)	currently
changed	combination	constitute	currents
changing	combined	construct(ing)	curve
chapter(s)	combustible	consumes	customer
characteristic	comfort(able)	contact(s)	cuts
charged	commercial	contain(ed) (er)	cutting
charges*	companies	(ers) (ing) (s)	cycle
charging	comparable	contentment	damage(d)
chart	compare(d)	continuous	(s)
chases	complaining	contract*(or*)	dangerous
chassis	completed	(s)	dangers
chatter	completion	contribute	date(s)
check(ed)	complex	controlled	dc
(ing) (s)	compliance	controller	dealing
chewed	comply	controls	decimal
choose	component(s)	convenient	de-energize
choosing	composition	conveyors	defined
chosen	compressed	cooling	defining
chromium	compression	cools	definition
circuit*(s*)	compressor	cooperate	deflection
circulate(s)	computation	coordinate	degrees
cited	computed	coordination	delay
claim	computer	cope	delivered
clamping	concealed	copper	delivery
classed	concentrate	copy	demagnetize
classes	concept(s)	cord(s)	demand
classification	concise	core*	demolition
classified	concrete	correct(ed) (ion)	demonstrate

ELECTRICIAN (continued)

denominator	distinguish	effectiveness	evaluates
density	distorts	eight	evaluation
depend(ency)	distributing	elect	event(ually)
(ent) (ing) (s)	diversity	electric*(al*)	evident
deposits	dives	(ian) (ity)	exact(ly)
depth	divided	electrode(s)	exam(ine)
derived	divider(s)	electromotive	(ples)
description	documents	electron(ic)	excavators
designating	dodge	(s)	exceed(ing)
designation	dollar(s)	element	exception
desired	dominated	elevator	excess(ive)
detail	doors	eliminate(d)	excluding
detect(or)	doses	elsewhere	exclusive
deteriorate	dotted	embarrassment	excuse
determinant	double	embedded	execution
determining	drag	emergency	executive
develop(ing)	draglines	emf	exhaust(ed)
(s)	drain	emotional(ly)	exist(ing)
device(s)	draw(ing)	emphasis	(s)
diagram(matic)	(ings) (n)	employed	expands
(s)	dredges	empty	expense
die	dressed	enclosed	experiencing
dielectric	dribble	enclosure(s)	experiment
differently	dried	encountered	explain(ed)
differing	drift	energize(d)	explosions
dimensional	drills	energy	exposed
dip	drips	engages	expressing
directed	drives	engineering	expression
dirt	driving	engineers	expressly
disagreement	drop(ped)	engraved	extended
disassociate	(s)	enhances	extensive
discharge	drove	enter	external
disconnect	drum(s)	entrance	extra
discourage	dry	envelope	extremes
discovered	dual	environment	facilities
discussed	duct(s)	equal(s)	factor
discusses	dug	equation*(s*)	failure
discussing	dull	equipment	false
disease	dumped	equivalent	familiar
disintegrate	dust	erratic	families
dislike(s)	dynamic	errors	fan
disorder	easier	escape	fascinating
display	economy	essential(ly)	fast
disputable	edition	estimate	fastened
distinct	effectively	etc.*	fault

ELECTRICIAN (continued)

favor(able)	fraction(al)	grease	hostile
fears	(s)	grids	hp
feature	frame	grinned	humidity
fed	freezing	grounded*	hundredth
feedback	frequency	grounding*	hypotenuse
feeder*(s)	frequently	grout	identify(ing)
ferromagnet	Friday	grow(s)	identity
fiberglass	frozen	guarantee	illustrate
fields	frustrating	guard(ed)	imbalance
fifteen	frustration	guess	immeasurable
fifth	fullscale	guide(lines)	immediately
fig.	fully	guns	impedance
figured	fume	gutter(s)	impression
filing	functional	habits	improper
fill	functioning	hallway	inaccessible
filtered	functions	handbook	inadequate
financial	fundamental	handicap	incessantly
finding	furnishes	handle	inch(es)
finds	furnishing	handout	incidental
finish(ed)	furthermore	handy	included
(es)	fuse(s)	hanger	includes
fireplace	gage	hanging	inconvenient
fires	gallons	happening	increases
fit(ting)	galvanized	happens	increasing
(tings)	games	happiness	incurred
fixture*(s)	gases	harm	independent
flammable	gasoline	hazardous	indicate
flattened	gauge	heat(er)	indication
flexible*	gear	heat-reacting	indoor
floatless	generate(d)	height	induction
floors	generating	hence	inductive
flow(s)	generation	herein	inductor
fluids	generator(s)	hertz	inexpensive
flush	gets	high(er)	influenced
flux	giving	(est)	influences
focus	glad	highpower	informal
follow	glandular	hill	informed
fool	glass	hoists	initial
foot(ing)	goes	holder	inoperative
forced	gold	holds	input
foregoing	govern(ing)	hole(s)	inquiry
formula	grade	hoods	insert
forth	gradual	hook	inspection
forty	graph*(s)	horizontal	inspector
fourth	grass	horsepower	installation*

ELECTRICIAN (continued)

installed	junction	limiting	maternal
instance(s)	keen	linear	mathematic
instant	keeping	lingering	mature(s)
instinct(ive)	kicked	lining	maturing
instruction	kidding	link	maturity
instrument	kill	liquefied	maximum
insulated	kilo(gram)	liquid*(s)	measure(d)
insulating	kinds	listed	(ment) (s)
insulation	knock(out)	listing	measuring
insulator	(outs)(s)	literal	mechanical
integers	kw	lives	mechanism
integral	lab	load*(s)	median
intellectual	label(ed)	located	meets
intense	(ing)	location(s*)	melting
intent	laboratories	lock(ed)	memory
interact(ion)	laboratory	logical	mental(ly)
interchange	lag(s)	longest	mention
interference	laminated	looped	mercury
interior	lamp(s)	loosely	merit
interlocks	lampholder	loosen	message
internal	largest	loses	messed
interrupting	lash	losing	metal*
intersection	late	loss	meter*(s)
intervals	latest	low	mezzanine
interwoven	lattice	lug(s)	microsecond
intolerable	laws	machine(d)	mil
introduce(d)	layout(s)	magazines	milli
introducing	lays	magnet(ic*)	mine
introduction	lcd	(ism)	minimum
inverted	lead in	(ized)	minority
investigate	leading	(izing)	minute
invisible	leads	magnitude	misaligned
invited	leakage	mainly	missed
involve(ment)	leaking	maintain(ed)	missing
(s)	leaves	(ing)	mistake
involving	legs	(s)	mistuned
iron*	lessen	majority	misunderstand
irritability	lesser	manage	misused
isolated	liability	mandrel	mixed
item(s)	lifetime	manganese	mobile
jacket(ed)	lighting	manual	moderate
jerk(ed)	lights	manufacture	moisture
joint(s)	liked	mark(ed)	molecular
judgment	likes	marriage	molecules
jumper*	limitation	materials*	moreover

ELECTRICIAN (continued)

motion	offensive	parallel(ed)	polarities
motivated	officials	paralysis	polarity
motivation	offset	paresis	pole
motives	ohm(meter) (s*)	park	polynomial
motor*(s)	oil	partially	popular
mounted	older	pass(ing)	porches
movable	opening(s)	pasted	portable
ms	operate(d)	patching	portal
multimotor	operating	path	portion(s)
multiple	operations	peak	pose
multiplication	opposite	pendant	positioned
multiplied	orators	penetration	positive
multiply(ing)	ordered	perceivable	possibility
mv	ordering	perceive	post
named	orders	percent	potential
nameplate	ordinance	perception	pour(ed)
nationally	ordinarily	perceptual	powerful
nearest	orientation	perform(s)	powers
necessarily	original	periodic(al)	practical(ly)
necessary	oscillator	permanent	practice
negative	otherwise	permeability	preapplied
negligence	ought	permissible	precaution
neoprene	outdoor	permit(s)	preceded
net(work)	outgrow	(ted*)	preceding
neutral	outlet*(s)	perpendicular	precise
nickel	outlined	personality	precision
nights	outlive	personally	precoated
nine	output	phase(s)	predict
nineteen	oven	pick	preliminary
ninety	overcome	pictorial	premounted
noisy	overcurrent	pin	prepaid
noncombustible	overhead	pipe(s)	prepare(d)
nonhazardous	overlapping	piping	prescribed
nonmagnetic	overload	places	presence
nonmetallic	owner	plain	presented
normally	oxygen	planned	presupposed
noted	oz.	plastic	prevent(s)
notice	pace	plate(s)	previous
numerous	page	platinum	primarily
nurseries	pain	played	primary
objection	paint	playing	principles
obtain	pair(s)	pleasant	printed
occupation	panel(s)	plug(ged)	prints
occupy	panelboard	plus	prior
occur(s)	papers	pointed	probability

ELECTRICIAN (continued)

probe(s)	reaches	removal	rotating
procedure	react(ance)	remove(d)	rotation
proceed	readings	rename	rough(ing)
processes	reality	repaired	round
produce(d)	realize	repairs	routed
(s)	rearranged	repeat(ed)	row
producing	reasonable	repelling	rubber
product	reasons	repetition	rule(s)
profound	receive(r)	replace(d)	runs
prohibited	(rs)	represent(ative)	ruptured
project	receptacle	(ing) (s)	safe(ty)
proper(ly)	recessed	requested	salesman
properties	recessing	require(ment)	salvaged
protect(ed)	reciprocal	reserved	samples
(ion)	recognize(d)	reserves	sap
prove	(s)	reset	satisfaction
provides	recognizing	residual	satisfactory
provision(s)	reconnected	resist(ance*)	satisfied
publicity	reconnecting	(ant) (or*) (ors)	satisfy
published	recording	resolve(d)	saturated
pull	recovered	resolving	Saturday
pullboxes	rectangular	resonance	scale(d)
pulse(s)	rectified	resonant	scare(d)
pump(s)	rectifier	resources	(s)
pure	reduce(d)	respective	scheduled
purple	reduction	respects	schematics
purposes	reevaluating	respond(s)	scientists
putting	refer(red)	responses	scratch
quadratic	(s)	responsible	screen
quantities	refrigerate	resultant	screw(ed)
quantity	regard(less)	resulting	(s)
quarter	regular	reused	seal(ed)
quickly	regulate	revenge	secondary
quit(s)	regulation	reversal	seconds
raceway(s)	rejection	reverse(s)	sections
radial	relate(d)	rigid	secure(d)
rags	(s)	rise(r)	security
rails	relative(ly)	rocks	seek(ing)
raised	relay*(s)	rolled	segments
ranges	release	rolling	seldom
rapidly	relieved	roofed	select(ion)
rare	relocate	rooms	self
rated	relocation	root(s)	self-concept
rating*(s)	remain(s)	rotated	semiconductor
ratio	remedied	rotates	send(ing) (s)

ELECTRICIAN (continued)

senses	sized	steel	suspended
sensing	sizes*	sticky	switch
sensitivity	sketch(es)	stimuli	switchboard
separate(d)	slide	stimulus	symbol
separating	slight(ly)	stopping	symmetrical
separation	slot	stops	symmetry
sets	smaller	storage	synonymous
setting	smallest	store	systematic
settle(d)	smash	storeroom	tags
setup	smell	stranded	takes
seventy	smoke	stray	tall(er)
severe	snap(s)	strengths	tank
shafts	sockets	stressed	tap(ped)
shakes	soft	strictly	(s)
shaped	solenoid	strips	task(s)
sharp	solid	strongly	teams
sheaths	solution*(s)	structural	technician
shed	solve(d)	structure	tedious
sheet	solving	stuck	telephone
shipment	sounding	studied	television
shock	sounds	studies	telling
shop	source(s)	stuff	tells
shortcircuit	southwest	subjected	temporary
shortest	spacers	submit	tend(s)
shots	spaces	substance	tent
shovels	specifically	substation	term
showing	specification*	substitute	terminal*(s*)
shows	specified*	subtract(ed)	terminate(d)
shunt	spend	(ion)	terminating
shut(s)(ting)	splice(s)	sufficient	termination
sign(s)	split	suggestion	tested
signal	spot	suitable	testing
significant	square	suites	tests
silver(s)	stability	sum	text(books)
silverplate	stable	super	theories
similarly	stages	superintendent	therein
simplex	stainless	supplement	thermal
simplified	standards	supplied	thermometer
simplify	standstill	supplies	thickness
simulates	starter	supply(ing)	thirteen
simulating	starts	supported	thirty
simultaneous	stated	supports	thoughtless
site	statements	surge	thousand*(th)
sixteen(th)	staying	surgical	threats
(ths)	stays	survival	throw(n) (s)

ELECTRICIAN (continued)

tile	unbroken	utility	watt(s)
tired	uncoated	utilization	wave(s)
tolerate	unconscious	utilize	(shape)
tolerating	underground	valve(s)	(shapes)
tool(s)	underneath	vapors	weak(ly)
torque	understood	variable(s)	wear
touch	underwriter	variation(s)	weather
tracings	uneven	variety	wet
trades	unfinished	vary(ing)	whenever
trailers	ungrounded	vast	wherever
train	uninsulated	ventilating	wherein
transformed	unique	verified	wider
transistor	unit(s)	verify	width
trapped	(y)	versus	winding(s)
treated	unknown*	vertical(ly)	windows
tremendous	(s)	vessels	wire*(d)
triangle(s)	unless	viewed	(s)
trig.	unnecessary	viscous	wiring*
triggered	unpleasant	visible	wise
trigonometry	unqualified	visually	withdrawal
trips	unsymmetric	volatile	wonder
trust	unused	volt*(age*)	workable
tub(s)	unusual	(ages*)	workmanlike
tube(s)	upper	(s*)	workmen
tubing	usable	voltmeter(s)	worse
tunnel(s)	usage	walls	wound
turning	useful	wants	wrapped
twenty	useless	warehouses	wreck
twice	uses	waste	yard
twist	u-shaped	watch(ing)	zero
unbalance	usual	waterproof	zinc

HIGH FREQUENCY WORDS HEATING/AIR CONDITIONING MECHANIC

application	cycle	inches	relay
bottom	defrost	installed	resistance
branch	discharge	joint	safety
cabinet	drop	liquid	starting
cap	duct(s)	location	steel
capacity	electric(al)	manufacture	storage
check	energy	metal	suction
circuit	evaporator	models	supply
coil	expansion	mortar	switch
combination	feeder	oil	takeoff
compressor	fittings	operating	thermostat
condenser	flow	pipe	trunk
condensing	fluid	(s)	tubing
conditioning	foot	plenum	unit
connection	gas	pound	valve
constructing	gauge	proper	(s)
contract	glass	pump	velocity
controls	heat(ing)	refrigerant	voltage
cooling	ice	refrigerate	weight

TECHNICAL VOCABULARY HEATING/AIR CONDITIONING MECHANIC

abnormally	amperage	basically	capable
absorbed	amperes	basin(s)	capacities
absorbing	amplifies	battery	capacitor
absorbs	angle	beam	capacity*
accepted	angular	bearing(s)	capillary
access(ible)	apart(ment)	bedded	capital
(ories) (ory)	apparatus	bedding	carbon
accomplish	appearance	belt	carry(ing)
accordance	application*	bend(s)	casing
accordingly	apply	bimetal	cast
accumulate	appreciable	bit(s)	catalog
accumulating	apprentice	blade	catalyst
accumulatory	approached	block(ed)	catch
accuracy	approaches	(ing)	caught
accurate(ly)	approaching	blow	caused
actions	appropriate	blower	causes
activates	approved	boil(er)	causing
acts	approximate	(ing)	cavitation
actual	arch	bolt(ed)	cement
actuated	Archimedes	bonds	centered
adapted	architect	border	centerline
adequate	arranged	bottom*	centers
adjacent	arrangement	bouyancy	certified
adjoining	article	bouyant	chalk
adjust(able)	asphalt	bracket(s)	chamber
(ed) (ment)	assemble(d)	branch*(es)	changed
advanced	assembly	break(s)	chapters
advantaged	assist(ance)	bronze	characteristic
advantages	assumed	btu(s)	charged
affect(ed)	assure	build(er) (s)	charging
(ing)	atmosphere	built	chart(s)
affords	attached	bulb	check*(ed)
agency	attempted	bulge	(out)
alarm	attract(ion)	bulk	chemical
alignment	automatic(ally)	burial	chisel
allowance	automobile	buried	circuit*(s)
allow(ed)	availability	burner(s)	classification
(s)	avoided	burning	cleared
alloy	backfill	butane	climates
alternate	backup	cabinet*(s)	coal
alternating	bacteria	cadmium	code(s)
alternator	balance	calculate(d)	coil*(s)
altitude	barely	calculation	collect
aluminized	base	cam	column
ambient	basement(s)	cap*	combination*

HEATING/AIR CONDITIONING MECHANIC (continued)

combined	contact(or)	cutout	dimension(s)
combo	(s*)	cycle*(s)	directed
combustion	contain(ed)	cycling	directions
comfort(able)	(er) (ers) (s)	cylinder	dirt(y)
comment	contaminate	damage(d)	disc
commercial	content	(s)	discharge*(d)
commonly	continual	damp(er)s	disconnect(ing)
commutator	continues	danger(ously)	discussed
compact	continuous	debris	discussing
companies	contract(or)	decent	displace(d)
compared	contribute	decrease(s)	(ment) (s)
competence	contributing	decreasing	display
competent	controlled	defective	dissimilar
competition	controller	defrost*	distances
compiled	controlling	degrees	distribute
completed	controls*	deliver(ed)	distribution
complex(ity)	convenience	(y)	distributor
complicate	convention	deluxe	disturb(ance)
component(s)	conversion	denser	dizziness
compounds	convert	densest	dock
compress(ed)	convex	density	domestic
(ing) (ion) (or*)	convey(ed)	dependable	downstairs
compromise	(or)	dependence	downward
computation	cooler	dependent	drain
computed	cooling*	depending	draw(ing)
computing	coolness	depressed	(ings) (n)
concerning	cools	describe(s)	drop*(ped)
concrete	coop	description	(s)
condensate	copper	designation	dry
condensating	correct(ly)	designer(s)	duct*(s*)
condense(r*)	correspond	designing	dynamically
(rs) (s)	corrosion	desirable	economical
condensing*	counter	desired	effectively
condition(ing*)	cradle	detail	effectiveness
conductor	crankcase	determination	efficiency
conform	crankshaft	develop	eighths
connect(ed)	collar	device(s)	electric*(al*)
(ing) (ion*)	crew	devise(s)	(ity)
conservation	critical	diagonal	electrode(s)
considerable	cross	diameter	electromagnet
consisting	crown	die	electron(ic)
constant	cube(s)	differ(ed)	element
constructed	currents	(ent) (entiate)	elevation
constructing*	curved	diffuser	eliminates
consumption	customer	dilutes	elsewhere

HEATING/AIR CONDITIONING MECHANIC (continued)

embedding	excerpt	fixture(s)	gang
emersion	excess(ive)	flame	garage
employing	exchanger	flange	gas*(eous)
employs	exclusively	flare	(es)
enamel	exerted	flaring	gasketing
encased	exerts	flash	gate
encases	exhaust	flexible	gauge*(s)
enclose	exist(ing)	floats	gear(ed)
enclosure(s)	(s)	flow*(ing)	generated
encounter	expanding	(s)	glass*
energized	expands	flue	governed
energizes	expansion*	fluctuation	gpm
energy*	expensive	fluid*(s)	grab(bed)
engine	experiment	fluidic	grade(s)
enter(ing)	exposed	flux	graph
(s)	exposure	foam(ed)	gravity
enthalpy	extend(ed)	foot*(ing)	grease
entrance	extension	forced	grille(s)
environment	external	forest	groove
equal(s)	extremely	forgot	grow
equilibrium	factor(y)	formation	hammer
equipped	failure	formed	handle(d)
equivalent	fairly	formula	hanger
erosion	falls	forth	hardens
erratic	false	fraction	heat*(ed)
escape	fashioned	frame	(er) (ers) (ing*)
essential	fastest	freely	heavier
establish	faucet	freeze	heavily
estimate(d)	fault	freezing	height
(s)	features	frequently	helical
estimating	feeder*	friction	hence
etc.	feeds	frost	hiding
ether	fiberglass	frozen	hinges
evaporate(d)	fig.	ft.	horizontal
(s)	figured	fuel(s)	horsepower
evaporation	filament	functioning	hose
evaporative	filings	fundamental	houses
evaporator*	filter(s)	furnace	housing
eventually	fingers	furnish	hovered
exactly	fins	(ed)	humidity
examine	fireplace	fusible	hydraulic
examples	firmly	fusion	ice*
exceed	fit(s) (ted)	gable	icemaker
excellent	(ting) (tings*)	gain	identify
exceptional	fixed	gallon	ignition

HEATING/AIR CONDITIONING MECHANIC (continued)

illustration	intersection	louvers	modulating
immediately	invented	lowered	moisture
immersed	isolated	lowering	met
impeller	items	lp	mold
impingement	jackets	lubricated	molecules
imported	jar	machine(d)	monitoring
imposed	jobs	(s)	monitors
impossible	joint*(s)	magnetic	mortar*
inch(es*)	kinetic	mains	motion
included	kit(s)	maintain(s)	motor(s)
incoming	latent	manhole(s)	mount(ed)
incorrect	lavatory	manifold	(ing)
increases	layoff	manual(ly)	multi
independent	layout	manufacture*	multiple
indicate(s)	leader	marble	multiplication
indicative	leading	margin	multiply(ing)
inexhaustible	leak(age)	mark(ing)	multispeed
inferior	(s)	marketplace	needle
infiltrating	leaving	match(ing)	negative
inherent	lengthen(ing)	materials	nema
initial(ly)	lengths	maximum	neutral
initiated	levels	measure(d)	nipple
initiating	lever	(ment) (s)	nominal
inlet(s)	library	measuring	non
inner	lift(ed)	mechanic(al)	nonadjustable
inserted	(s)	medium	nonpolluting
inspected	lightweight	melt(ed)	nonposition
install(ation)	limit(ing)	(s)	normally
(ed) (er) (ing)	lineal	merchandise	northeastern
instance(s)	lined	metal*(s)	object(s)
instruction	linting	meter(ed)	observed
instructor	liquid*(s)	(ing)	obstruction
insufficient	liquified	metric	obtain(ing)
insulating	listed	midair	occasional
insulation	listing	milder	occupant
insurance	lists	millivolts	occur(red)
insure	lit	minimum	(s)
integral	lites	minus	offset(s)
intensity	liver	minute	ohms
interior	lives	missed	oil*(s)
intermittant	load(ing)	mistake	oneway
intermitted	locate(d)	mixed	opening
internal	locating	model(s*)	operate(d)
interrupting	location*(s)	modification	operating*
interrupts	logical	modulate	operators

HEATING/AIR CONDITIONING MECHANIC (continued)

opposite	pipe*(s*)	progressive	reduction
optional	pipeline	promptly	reeds
ordered	pipng	propane	refer(red)
orifice	piston(s)	proper*(ly)	refreezing
original	pitted	properties	refrigerant*
originate	planter	proportion	refrigerate*
OSHA	plaster	proposed	regained
outdoors	plastic	proprietor	region
outer	plate(s)	protect(ed)	register(ed)
outlet(s)	playing	(ing) (ion) (ors)	(s)
outlined	plenum*(s)	provides	regular
output	pliable	providing	regulates
overall	plug	provision	regulating
overcharge	plumb	psc	regulation
overcome	pneumatic	psi	regulator
overflow(s)	poisoning	psig	reinforced
overhead	polyurethane	ptc	related
overload(s)	porous	published	relations
overtime	port	puffing	relative(ly)
oxide	portion	pulley	relay*(s)
oxidized	positioning	pump*(ed)	release(d)
panel(s)	positive	(ing) (s)	remain(s)
parallel	potential	purchased	remodel
parcels	pound*(s)	quadrant	remote
partial(ly)	pour	quantities	remove(d)
partition(ed)	powered	quantity	removing
passing	practical	quarter	repair
patented	practice	ranging	repeated
path(s)	preceding	rapid(ly)	repel
pension	precise	rated	replacement
percentage	preheat	rating	represent(ed)
performance	prepared	reads	(ing) (s)
performs	preservation	reasonable	require(ment)
perimeter	preserves	recall	(s)
periodic	pressures	receiver	reservoir
periods	prevent(ing)	receives	reset
permanent	previously	receptacle	residence(s)
permit(s)	primarily	recirculate	residential
(ted) (ting)	principles	recognized	resistance*
pertinent	print(ing)	recommended	resistant
petroleum	procedure(s)	record(ed)	resisting
phase	processes	(ing) (s)	resists
physics	produce(d)	reduce(d)	respective
pieces	proficient	(r) (s)	responds
pilot	progresses	reducing	responsible

HEATING/AIR CONDITIONING MECHANIC (continued)

restriction	sensation	soil	style(s)
retainers	sensiole	solar	subcooler
retains	sensing	solder(ed)	submerged
retarded	sensitive	solenoid	substance(s)
returning	separate(ly)	solid(ly)	subtract(ed)
returns	separation	solution	(ion)
reversed	servicing	solving	succeeding
reversing	settings	soot	success
review	settle	source(s)	suction*
ring(s)	shaft	spaces	sufficient
rod(s)	shape(d)	specification	suitable
roll(ed)	sharp	specified	summarize
(s)	sheet	speed	sump
roof	shelf	spigot	superfluous
rooms	shell	spoilage	superheat(ed)
root	shielded	spot	superintendent
rose	shipped	spout	supplement
rotor	shipping	squeaking	supplied
rough	shortage	squeaky	supplies
round	shortening	stable	supply*(ing)
rubbing	shows	stack(s)	supported
rugged	shunts	standing	supporting
rule(r)	shut	standpoint	supposed
(s)	shutoff	starter(s)	surge
rumble	shutters	starting*	surplus
rumbling	sign	startup	surrounding
runner	significant	stated	suspension
saddle	silencer	static	sustains
safety*	simplify	stationary	switch*(ing)
sanitary	sit	steam	tables
satisfactory	site	steamfitted	takeoff*(s)
satisfied	sizable	steel*	tamped
saturated	sized	stick(s)	tank
saturation	sizes	stocked	tap
scaled	sizing	stocking	technician
scope	slab	storage*	technique
seal(ed)	slanting	store(d)	tees
(er)	slick	storeroom	temporarily
seam	slide	storm	tend(s)
seasons	slightly	straighten	tentatively
sections	slings	strainer	term(ed)
securely	slope(d)	strains	terminal(s)
sedimentation	slowing	straps	termination
select(ed)	smaller	stream	terrazzo
(ion) (or)	smell	structure(s)	tested

HEATING/AIR CONDITIONING MECHANIC (continued)

tetrachloride	transmitted	upstream	volumes
textile	transported	upward	vulnerable
thermal	trap	usage	waist
thermistor	travel	utility	walls
thermocouple	trench	vacuum	wants
thermodynamic	trimmed	valuable	warmth
thermometer	trunk*	valve*(s)	washes
thermostat*	tube(s)	vane	washing
thick	tubing*	vapor(ization)	waste
thin	tunnel	(izes) (s)	waterproof
thoroughly	turbulence	variable(s)	weatherproof
thrust	turbulent	variation	weighed
tin	turning	varies	weight*(ed)
tissue	typical	vary	(less)
tolerate	UG	vault	(s)
tools	uncluttered	velocities	wick
torque	underground	velocity*	width
totals	undisturbed	vent(ilating)	winding
touch(ing)	unevenness	(ilation)	winter
tower(s)	uniform	vertical(ly)	wire(d)
traffic	unit*(s)	vessel(s)	(s)
trailer	universal	vibrating	wiring
trains	unknown	vinyl	worksheet
transfer(red)	unless	viscosity	wrap
(ring)	unlike	vittrified	yard
transformed	unnecessary	voids	yearly
transition	unopened	volt(age*)	yeast
transmission	upper	(s)	zero

HIGH FREQUENCY WORDS INDUSTRIAL MAINTENANCE MECHANIC

air	diameter	meter	refrigeration
angle	differential	minimum	relay
application	discharge	motor	relief
approximate	discs	mounted	resistance
braking	electrical	occur	resistor
cap	element	ohm	reverse
causes	energy	oil	screws
centrifugal	evaporator	operate	seal
chamber	factory	operating	setting
check	float	opposite	source
circuit	flow	output	speed
compressor	fluid	pan	stroke
condenser	formula	pilot	suction
connected	gas	pipe	supply
connection	gauge	piston	switch
contacts	heat	port	tank
controller	hydraulic	prevent	teeth
deflection	lift	proper	thousand
degrees	liquid	psi	valve(s)
determined	maximum	pump	volt(age)
device	mechanical	refrigerant	wear

TECHNICAL VOCABULARY INDUSTRIAL MAINTENANCE MECHANIC

abbreviate	affect(ed)	arch	bend(er)
ability	affords	arcing	(s)
abnormal	agency	arise	beneficial
abrasive	agent	arithmetic	bias
absorbed	air*	arm(ature)	bimetal
absorbing	alarm	arranged	bipolar
absorbs	algebraic	arrival	bismuth
abuse	align(ed)	article	bit
ac	(ing) (ment)	artificial	bite
accelerate	allow(able	assemble	blade
acceleration	(ed) (ing) (s)	assembly	blank
acceptable	alloy(ing)	assigned	bleed
accepted	(s)	assist(ance)	block(ed)
accessible	alternate(d)	associated	(ing) (s)
accessories	aluminum	assume	blow(er)
accessory	ambient	assure(d)	(ing) (n)
accommodate	amounts	atmosphere	blueprints
accompanying	amp(erage)	atmospheric	boil(er)
accomplished	ampere(s)	atoms	(s)
accordingly	amplifies	attach(ed)	bolts
accumulate(d)	anchored	(ing) (ment)	bonds
accumulation	angle*(s)	attempted	books
accuracy	angular	attract(ion)	bore(d)
accurate(ly)	anomaly	auto(matic)	boring
achieve	antifreeze	(matically)	bottle
acid	antimony	automobile	bottom
acting	anybody	automotive	bounce
activates	anyway	availability	bowl
acts	anywhere	avoid	box(es)
actual	apart	axis	bracket(s)
actuates	apparatus	bacteria	brake(s)
actuating	appearance	bands	braking*
actuator(s)	appliance(s)	bar	branch
acute	application*	bare	brass
adapted	applies	barium	break(down)
add(ing)	apply(ing)	base(s)	(er) (ers)
(s)	appreciable	baseplate	bridge
addendum	apprentice	basically	broken
adequate	approached	battery	brush(es)
adjacent	approaches	battle	btu(s)
adjust(able)	approval	beam	bubbles
(ed) (ing) (ment)	approved	bearing(s)	bucket
advanced	approximate	becomes	buffing
advantage(d)	arbitrarily	begin(s)	builds
(s)	arbitrary	belongs	buildup

INDUSTRIAL MAINTENANCE MECHANIC (continued)

built	centrifuge	collect(or)	considerable
bulb	cents	(s)	considerate
bullet(ing)	chamber*	colored	consists
(ins)	chances	column	constants
bullneck	changed	combination	construction
burial	changing	combustible	consult(ing)
burn(ed)	chapters	combustion	consumption
burrs	characteristic	comfort	contact(ed)
bushings	charged	commonly	(or) (ors) (s*)
butane	charges	communicate	contain(ed)
button	charging	commutator	(er) (ment) (s)
bypass	chart	compact	contamination
cabinet	check*(ed)	comparative	content
cadmium	chemical(s)	compared	continues
cage	cherry	compartment	continuous
calcium	chilled	compensate	contour(ed)
calculate(d)	chromium	competence	contribution
calculating	circle	competition	controlled
calculation	circuit*(s)	compiled	controller*
calibrated	circular	complaint	controlling
calls	circumference	completed	controls
cam	clamped	completes	convenience
canister	clamps	complex	convenient
canvas	clarified	component(s)	convention
cap*	classes	composition	convert(ed)
capacities	classification	compound	conveyer
capacitive	classified	compress(ed)	cool(ed)
capacitor	clean(ing)	(ion) (or*)	(est) (ing) (s)
capacity	clearance	comprise	copper
carbon	climates	computed	core
carefully	climb	concerning	corners
carrier(s)	clock(wise)	condensate	correct(ed)
carry(ing)	closely	condensation	correlation
casing	closes(t)	condense(r*)	correspond
cast(ing)	closing	(s)	corrode
catalyst	cloth	condition(ing)	corrosion
catch	cloudy	conduct(ion)	cotton
caused	coal	(or)	counted
causes*	coarse(r)	conduit	counter
causing	coat	cone	coupled
caution	cobalt	conjunction	coupler
cavities	code(s)	connect(ed*) (s)	coupling
cemented	coil(ed)	(ing) (ion*) (or)	cover(ing)
centerline	(s)	consequent	(s)
centrifugal*	coke		crack(ed) (s)

INDUSTRIAL MAINTENANCE MECHANIC (continued)

crankcase	describe(s)	disruptive	electric(al*)
crankshaft	descriptive	dissimilar	(ian) (ity)
creates	designated	distorts	electromagnet
crescent	designing	distribute	electron(ic)
critical	desk(s)	divided	(s)
cross	destroy	dividing	element* (ary)
crystal	detailed	domestic	elevators
cube(s)	detection	doors	eliminate(d)
cubic	deteriorate	dotted	(s)
curie	determined*	downstream	eliminating
currently	develop(s)	downtime	embedding
currents	devented	dozed	emergency
cursor	device*(s)	dozen	emersion
curvature	devise(d)	drag	emery
cushion(s)	(s)	drain(ed)	employ(ed)
cutaway	diagram(s)	(s)	(s)
cuts	dial(s)	draw(ing)	encases
cutter(s)	diameter*(s)	(ings) (n)	enclosed
cutterhead	diametrical	drawbar	enclosure(s)
cycle(s)	diaphragm	drift	encountered
cylinder(s)	die	drilled	ends
damage(d)	dielectric	drink	endwise
damper(s)	differential*	drip	energize(d)
dart	difficulties	driven	(s)
datum	digit	driver(s)	energy*
dc	dilemma	drives	engineers
deadman	dilutes	driving	enlargement
decrease(s)	dimensions	drop(out)	ensure
decreasing	dinner	(ped) (s)	enter(ing)
defective	directed	drum	(s)
defined	directional	dry	enthalpy
definite	directions	duct	entirely
deflection*	dirt(y)	dull	equal(ly)
defrost(ed)	disadvantage	dump(s)	(s)
degrees*	disagree	dust(s)	equations
delay	disassemble	duty	equilibrium
delivery	disc(s*)	ease	equipped
demand	discharge*	eccentricity	equivalent
densities	disconnect	economical	erection
density	discussed	edge(s)	erratic
depend(ence)	discussing	effectively	escape
(ent) (ing) (s)	disintegrate	effectiveness	essential
depress(ed)	dispenser	efficiency	(ly)
(es)	displacement	efficient	established
depth	display	elbow	etc.

INDUSTRIAL MAINTENANCE MECHANIC (continued)

evaporated	faulty	forged	gets
evaporating	feature	forks	girders
evaporator*	fed	formation	giving
exact(ly)	feedback	formula*(s)	gland
examine	feeder	forth	glass
examples	feeding	forty-five	glue(d)
exceed	ferrous	fourth(s)	gluing
exception(al)	fiberglass	fractional	goes
excerpt(s)	fields	frame	gold
excess(ive)	fig.	freely	governing
(ively)	figured	freerunning	gpm
excuse	filament	freezing	grade(s)
exercised	fill(ed)	freight	gradual(ly)
exerted	(ers) (ing) (s)	frequency	graduated
exhausted	filter(ed)	frequently	graduation
exists	finding	friction	grain(less)
expands	finer	frost(ing)	graphic
expansion	fingers	frouds	gravity
expedite	finish(ing)	frozen	grease(s)
expense	fit(s)	ft.	grip
expensive	(ting) (tings)	fuel(s)	grooves
experiment	fixed	full(y)	grounded
explained	flame	functions	grounding
explosion	flammable	fundamental	grow
explosive	flare	funnel	guess
exposed	flaring	furnace	guidebar
exposure	flash	furnished	guidelines
expressed	flask	furthermore	guy(s)
expression	flat(tening)	fuse(s)	hack
extension	flavor	fusion	halves
extensively	flexible	gage(s)	hammer
external(ly)	flight	gal.	handle(s)
extra	float*	galling	handling
extreme(ly)	flooded	gallons	happen(s)
facing	flour	gas*(eous)	hardened
factor(y*)	flow*(ing)	(es)	hardens
facts	(s)	gasket(ing)	harmful
failure(s)	fluctuation	gauge*	harsh
fairly	fluid*(ic)	gear	harvest(ed)
falls	flux	generate(d)	hazardous
familiar	flywheel	(s)	heads
fan	foam(ed)	generating	heat*(ed)
fashioned	follows	generation	(er) (ers) (ing)
faster	foot	generator	heavily
fattened	forced	geographic	helical

INDUSTRIAL MAINTENANCE MECHANIC (continued)

hence	index	isolated	lights
hide	indicate(s)	isolating	limits
highly	indicating	isolation	link(age)
hinges	indicative	items	liquid*(s)
hiring	indicator	jobs	liquified
hits	indirect	joints	listed
holders	indoors	keeps	listen
holding	inductive	kilo	listing
holds	inefficient	kilogram	lists
hole(s)	inertia	kinetic	lit
hollows	inexhaustible	knocks	lithium
hook(s)	inexpensive	knuckles	load(ed)
hopefully	infinite	labels	(ing) (s)
horizontal	initial(ly)	ladder	locate(d)
horsepower	initiated	lags	locating
housing	initiating	laid	location(s)
hubs	inlet	lamp	locker
humidifier	inner	lapse	locknut
humidistat	input	largest	locomotive
humidity	insert(ed)	latent	logarithms
hundredth	inspect(ed)	lathe	logical
hydraulic*	(ing) (ion)	latitude	loop
I-beam	install(ation)	lattice	loosely
ice	(ed) (ing)	layers	loosen
ideal	instance	laying	loses
idler	instruction	lbs.	loss
illustrate	instrument	leader	lowered
illustration	insufficient	leading	lowering
immediately	insulation	leads	lowest
immovable	insulator	leak(age)	lubricant
impedance	insure	(ing) (s)	lubricated
impeller	integral(ly)	lean	lubricating
imported	intended	leaving	lubrication
impractical	intense	lefthand	lucky
impregnate	intensity	leg	machinable
improper	interdependent	lengthen(ing)	machine(d)
inch(es)	interfere	lengths	(s)
(ing)	internal	lengthwise	magnesium
includes	interrupts	levels	magnet(ic)
incoming	intimate	lever	(ism) (ized)
incorrectly	inverted	lies	(izing)
increases	invisible	lift*(ed)	maintain(ed)
increasing	involving	(ing)	(ing)
increment(s)	inward	lighter	maintenance
independent	iron	lightest	majority

INDUSTRIAL MAINTENANCE MECHANIC (continued)

manganese	mistuned	numeral(s)	part time
manifold	mixed	nuts	partial(ly)
manometer	mixture(s)	oak	partition
manual(ly)	mode	object(ive)	pass(age)
manufacture	model(s)	obtain(ing)	(es) (ing)
mark(ings)	moderate	occur*(s)	path(s)
(s)	modification	ohm*(meter)	peak(s)
marketplace	modulate	(s)	pedal
master	modulating	oil*(s)	percent(age)
match	moisture	opening	perform(ing)
mate	mold	opens	(s)
materials	molecular	operate*(d)	periodic(al)
mating	molecules	(s)	periods
maximum	monitoring	operating	periphery
measure(d)	monitors	operative	permanent
(ment) (s)	monthly	operator	permeability
measuring	motion	opposed	permit(s)
mechanical*	motors	opposite*	(ting)
meets	mounted*	optional	personnel
melt(ed)	mounting	ordering	petroleum
memory	mover	ordinary	phase(s)
merchandise	multiple	orifice	phlange
mercury	multiplication	original	physics
mesh(es)	multiply(ing)	originating	pick(ed)
messed	multipurpose	oscillator	pictorial
metal(s)	needle	outdoor(s)	pieces
meter*(ed)	negative	outer	pilot*(ed)
(ing) (s)	neighborhood	outlet(s)	pin(s)
metric	net	output*	pinion
microampere	network	outward	pipe*(d)
micrometer	neutral	overcome	(s)
microsecond	nickel	overflow	pipng
milder	nicks	overheating	piston*(s)
milliliter	ninety	overload	pit(ting)
millimeter	nipple	override	pitch(es)
millivolts	nitrogen	oxidation	placing
mills	nominal	oxide	plants
mine(s)	nonfoaming	packaged	plaster
mineral	nonmagnetic	packings	plate(s)
minimizes	nonpolluting	page	platinum
minimum*	nonposition	painted	plug(ged)
minority	normally	pair	plumb
minus	northeastern	pan*(s)	plus
minute	notations	paragraph(s)	pneumatic
misalignment	nozzle	parallel(ing)	pocket

INDUSTRIAL MAINTENANCE MECHANIC (continued)

pointed	procedures	rapidly	relay*(s)
pointing	proceed	rare	release(d)
polarities	processes	rated	(s)
polarity	produce(d)	rating(s)	reliability
polishing	(s)	ratio	relief*
polyurethane	producing	reaches	relieve
pop(s)	product	reaching	remain(s)
port*	proficient	reactance	remedied
portion	programed	readily	remote(ly)
position(ed)	prompt	readjust	removal
(ing) (s)	proof	reads	remove(d)
positive	propane	rearranged	removing
possibly	proper*(ly)	receive(r)	repair
post	properties	(ers) (s)	repeat(ed)
potential	proportion	receptacle	repel(ing)
pound(s)	protect(ed)	recharging	repetition
pour	(ing)	reciprocal	replace(d)
powered	providing	reciprocate	(ment)
powers	psc	recirculate	replacing
practical(ly)	psi*	recognized	reporting
practice(s)	ptc	recommend	reposition
precise	pull(ed)	(ation)	represent(s)
precision	(ey) (s)	(ed)	reproduced
predetermined	pulsating	recording	reproduction
predominant	pulse(s)	recovered	require(ment)
preheat	pump*(ed)	rectangular	(s)
premature	(ing) (s)	reduce(d)	reservoir
premium	punched	(s)	reset
presents	purposes	reduction	resin
preservation	pushed	reeds	resistance*
preserves	pushing	refer(red)	resistant
preset	putting	refined	resisting
pressures	quantities	refineries	resistor*(s)
pressurize	quantity	refreezing	resonance
prevent*(ative)	quarter	refrigerant*	resonant
(ing)	quickly	refrigeration*	respective
previous(ly)	races	regained	responds
prices	rack	regardless	restore
primary	radial(ly)	region	restraining
prime(r)	radius	regular	restricted
principally	raise(d)	regulates	resultant
principles	raising	regulation	resulting
printed	ram	regulator	retains
printing	ranges	relationship	retard(ed)
prior	rapidity	relative(ly)	retraction

INDUSTRIAL MAINTENANCE MECHANIC (continued)

returning	scheduled	shipment	source*
returns	scoring	shipped	spaces
reverse*(d)	scratch(es)	shock	span
(s)	screw(ing)	shoe(s)	specialist
review	(s*)	shop	specialize
revolution	seal*(ing)	shortage	specially
ribs	(s)	shortening	specifically
rifle	seasons	shorter	specification
right	seating	shortest	specified
rigid	seats	shows	speed*(s)
rim	seconds	shunts	spend
ring	sectional	shut(s)	spin
rise(s)	sections	shutdown	spindles
rising	secure(d)	sides	spoilage
rod(s)	securing	sight	spool
rollers	seldom	signal	spot(s)
rooms	selected	significant	springload
root(s)	selecting	signs	springs
rotary	selection	silver(s)	sprung
rotate(d)	self	similarly	spur
(s)	selling	simultaneously	stability
rotating	semiconduct	sitting	stable
rotation	sends	sizes	stages
rotor	sensed	sizing	stainless
rough	senses	sleeve	stalled
round(ed)	sensing	slide	standing
row	sensitivity	sliderule(s)	standpoint
rubber	separate(ly)	slight(ly)	starch
rugged	separation	slot(s)	starting
rule(s)	sequence(d)	slow(ing)	starts
runner	serial	slurries	starve
runs	serviceability	slurry	stated
rust	servicing	smaller	stations
saddle	setting*(s)	smooth	staying
safe(ty)	setup	soap(s)	stays
sag	severe	sockets	steam
sand	severity	sodium	steel(s)
sandwich	sewed	soft	steep
satisfactory	sewing	solar	stem(s)
satisfied	shaft(s)	sold	stick(ing)
saturated	shape	solder(ed)	stiff
saturation	sharp(ness)	solenoid	stopping
saving	sheet	solid(s)	stops
scale(d)	shift(ing)	solution	storage
(s)	shiny	solve	store(d)

INDUSTRIAL MAINTENANCE MECHANIC (continued)

storeroom	symmetrical	throat	underneath
straighten	symmetry	through	underside
strain(er)	syphon(ing)	throw	understood
(s)	tables	tight(ly)	underwrite
stray	tags	tighten(ing)	unequal
stream	takes	till	unidirectional
stressed	tangent	timed	uniform
string	tank*	tolerances	unit(s)
strips	tanned	tool(s)	(y)
stroke*	tape	tooth	universal
stronger	taper(ing)	torque	unknown
strongly	(s)	touch	unless
strontium	taperheaded	toward	unlike
structural	taps	trained	unload(ed)
structure	task	transfer(red)	unmodified
stub	technically	transform(ed)	unsymmetrical
stuck	technician	(ing)	unwanted
stuff	technique	transistor	upper
style	technological	transition	upright
subcooling	tee	transmission	upside
subjected	teeth*	transmitted	upward
substance(s)	temp.	transported	usage
substantial	temporarily	travel(ing)	useful
suction*	temporary	tray	user
sufficient	tend(ency)	treated	usual
suitable	tension	triggered	utilized
sum	tenth	trigonometry	vacuum
sump	term	trimmed	valuable
super	terminal(s)	tripped	valve*(s*)
superheat	terminated	trips	vane(s)
superheated	text	truck	vapor(ization)
supplied	textile	tube(s)	(izes) (izing) (s)
supply*(ing)	theoretical	tubing	variable
supported	thereby	turning	variation(s)
supports	thermal	turns	varied
supposed	thermistor	twenty	vary(ing)
surfaces	thermodynamic	twice	velocity
surge	thermometer	twirled	vent(s)
surgical	thermostat	twisted	vertical(ly)
surrounding	thick(ness)	twisting	vibrating
suspended	thin	u-shaped	viewing
suspension	thorough(ly)	ultimately	vinyl
switch*(ed)	thousand*(th)	unassemble	viscosity
(es) (ing)	thread(ed)	unbalanced	visually
symbols	(s)	undercut(ing)	volatile

INDUSTRIAL MAINTENANCE MECHANIC (continued)

volt*(s)	weak(ly)	width	worm
voltmeter(s)	wear*	winding	wormgear
wait	wedging	(s)	wormwheel
walls	weight(ed)	wings	worn
warm(th)	(less)	wipe(r)	wrapped
washers	welcome	wiping	wrench
washes	wet	wire(d)	wrinkling
wasted	wheel(s)	(s)	yearly
watch	whereas	wood	yeast
waterproof	wick	(en)	zero
wave(s)	widely	wool	zinc
waveshape(s)	wider	workmen	zone

HIGH FREQUENCY WORDS LICENSED PRACTICAL NURSE

administer	disease	mouth	physician
bath	(s)	muscle	procedure
bit	dry	(s)	proper
blanket	ear	nasal	site
brain	external	needle	skin
catheter	female	nurse	stomach
cells	fluid	ordered	thank
chair	glands	orders	tissue
check	infection	pain	traction
clean	juice	patient	tube
condition	medication	(s)	unit

TECHNICAL VOCABULARY LICENSED PRACTICAL NURSE

abbreviate	administer*	amounts	arises
abdomen	admission	ampule	arm(ed)
abdominal	admit(ting)	anal	armchair
abilities	adrenal	analgesic	armlets
ability	adult(s)	analyze(r)	arranged
abnormal(ity)	advance	anatomical	arrangement
abortion(s)	advantage(s)	anchor(ed)	arranges
abscess	adverse	(ing)	arrhythmia
absolutely	advise	ancient	arrives
absorbed	aerosol	anemia	arterial
absorption	affect(ed)	anesthesia	arteries
accept(able)	(ing)	anesthetic	arteriosclerosis
(ance) (ed) (ing)	(ion)	aneurysm	artery
access(ory)	affiliated	angiograph	articles
accident(al)	affix	angle	artificial
(s)	afraid	ankle	ascending
accommodating	aged	annually	aseptic
accompanies	agencies	anorexia	aside
accompany	agency	answers	aspects
accomplish	agent(s)	antepartum	aspirin
accounted	ages	anterior(ly)	assemble
accredited	agitation	anthologic	assess(ment)
accumulating	agree	antiabortion	assigned
accurate	aids	antibiotic	assist(ance)
achieve(d)	airway	antibodies	(ing) (s)
acidic	alcohol(ism)	anticipate	assume(s)
acidosis	alert	anticoagulant	assuming
acids	algia	antiseptic	assurance
acoustic	aligned	anus	assure(d)
acquire	alignment	anvil	atheist(s)
acted	alimentary	anxiety	atmosphere
actions	alkaline	anybody	atria
active	allergen(s)	anything*	atrophy
acts	allergic	aortic	attach(ed)
actual	allergy	appearance	attend(ance)
acute	allow(ed)	appears	attitudes
add(ing) (itive)	(s)	appended	auditory
(itives) (s)	alter	appliance(s)	automatic(ian)
adeno	altogether	application	avoid(ed)
adequate(ly)	alveolar	apply(ing)	(s)
adhere	alveoli	appropriate	awake(n)
adhesive	ambulate	approximate	aware
adjacent	ambulating	aquatic	axial
adjoining	ameliorating	aqueous	axilla
adjust(ment)	amino	argue	axillary

LICENSED PRACTICAL NURSE (continued)

axis	bit*	button	cerebral
baby	bladder	cabinet(s)	ceremony
bacteria(l)	blanket*(s)	caking	cervical
bacteriostasis	bleed(ing)	calibration	cervix
balance(d)	blinking	calorie	chair*(s)
band	bloodletting	canal(s)	challenge(d)
bank	bloodstream	cancels	chamber
baptism	blurry	cancer	changed
bar(s)	board(s)	cannula(s)	changing
bare(ly)	bodies	cans	chapel
barrel	bodily	canvas	chapter(s)
base	bone(s)	cap	characteristics
basically	bottle(s)	capable	charged
basin	bottom	capacity	charges
bath*(s)	bowel	capillaries	charging
bathe	brace(s)	capsule	chart(ing)
bathing	brachial	carbohydrate	check*(ed)
bathroom	braid(ed)	carbon	(ing)
beat(s)	(ing) (s)	carcinoma	cheek
bedding	brain*	card	chemical
bedmaking	break	cardiac	chemosensis
bedpan	breakdown	cardiovascular	chemotherapy
beds	breakfast	cared	chest
bedside	breast	careful(ly)	chilling
behave	breath	caring	chocolate
behavior	breathe	carotid	choking
belief(s)	bridgework	carrier	chronic(ally)
believed	bringing	carry(ing)	chronological
bell	brings	cart(s)	churned
belly	broken	cartilaging	cigarette
bend	bronchi	cast	cilia
beneficial	(als)	catch(ing)	circle(s)
benefit	(oles)	catheter*(ize)	circuits
benign	bruise	caught	circular
bent	brush	caused	circulation
benzine	bubbles	causes	circulator
besides	bubbling	causing	circumstance
betaine	buckets	caution	circumvent
bevel	build	cavities	cirrhosis
bile	built	cavity	cisternal
billionths	bundles	cease	civilized
bills	burned	ceiling	claims
bin	burning	cells*	clamp
biopsy	burns	cellular	classified
birth	buttocks	centers	clean*(ed) (ing)

LICENSED PRACTICAL NURSE (continued)

cleanliness	completed	contraindicate	croupette
cleanse	complex(ity)	contrast	crowded
clears	complicate	contribute	crusting
clergy(man)	complication	contributing	crusts
cling	component(s)	controlled	cup(s)
clinical	composed	controlling	curable
clockwise	compress(ion)	controls	cure
closely	concentrate	convenience	curved
closer	concept(ion)	convenient	cutdown
closets	(s)	cooled	cute
closeup	concern(ing)	cooling	cuts
clothes	(s)	cools	cycle
clothing	condition*	coordination	cyst(s)
clubfoot	conductive	cope	damage(d)
clues	conduction	cord(s)	danger(ous)
clumping	cones	cornea	date(d)
cluster(s)	confined	corners	deafness
cochlea	confirmation	correct(able)	dealing
code	conform	(ive)	ideal
collapse	confused	(ly)	decides
collar	congenital	correlation	decrease(d)
collateral	congestion	corridor(s)	deems
collection	conjunction	corset(s)	deeper
colon	conjunctive	cotton	defacation
colored	connect(ed)	cough(ing)	defatting
colors	(ing) (ion) (s)	counseling	deficiency
colostomies	conscious(ness)	counselor	deficient
colostomy	consent(ed)	count	defining
column	(s)	coupled	definite(ly)
coma(tose)	consequently	courts	definition
comb(ed)	considerate	cover(ing)	deformities
combat	consist(s)	(s)	defrost
combination	constant(ly)	cradle	degrees
combine(d)	constipate	cranial	dehydration
combining	constipation	cranium	delay(ed)
comfort(able)	contain(er)	cream	delivery
commands	(ing) (s)	credit	deltoid
commercial	contaminate	crest	demanding
commode	content	crimping	demands
commonly	contest	crippled	demonstrate
communicate	continues	crippling	dentures
communion	continuing	crisis	depend(ency)
comparison	continuous	critical	(ent) (ing) (s)
complain(ed)	contract(ed)	crooked	deposited
complement	(ion)	cross	depress(ed) (ion)

LICENSED PRACTICAL NURSE (continued)

depth	dirty	drop(ped)	empty
derivative	disabilities	(s)	enabled
dermis	disbelieve	drug(s)	enables
descending	discard	drum	encased
designated	discharge(d)	dry*	enclosing
desirable	discomfort	ducts	encounter
desire(d)	discontinuous	duties	encourage(s)
(s)	discourage	duty	ending
desirous	discovery	dying	endocrine
destitute	discussed	dyscrasia	endometriosis
destroy(ed)	discussing	ear*(s)	endometrium
destruction	discussion(s)	eardrum	endoplasmic
detail(s)	disease*(s*)	earliest	enema(s)
detect(ing)	disinfect	ease	energy
develop(ing)	disintegrate	easier	engulf
(s)	disks	eat(en)	enlarged
deviation	disorder(s)	(ing)	ensues
devices	displays	edge	ensure
diabetes	disposable	effectively	enter(ed)
diabetic	dispose	eggs	(ing) (s)
diagnose(d)	distended	eight(h)	enterobius
diagnosis	distends	(y)	entirely
dial	distilled	elapses	entitled
diarrhea	distinguish	elasticity	entrances
diastole	distortion	elderly	entwining
die	disturbance	elective	envelope
diet	divide(d)	electrical	environment
dietary	dividing	electrocardiogram	enzyme(s)
differ	doctor(s)	electrolyte	epidermis
difficulties	dormant	electronic	epiglottis
diffusion	dosage	element	epilepsy
digest(ion)	doses	elevated	epimysium
(ive)	downward	elevation	epithelial
dilated	drag	elevator(s)	equal
diluent	drainage	eleven	(ized)
dim	draining	eliminate	(ly)
dimples	drains	elimination	equinovarium
dinner	drastic	embryo	equipped
dioxide	draw	emergencies	era
diphtheria	drawer	emergency	errand
directed	drawsheet	emotion(al)	error
directing	dressng	empathy	erythema
directions	dried	emphysema	escape(s)
directives	drink(s)	employed	esophageal
directs	drip	emptied	esophagus

LICENSED PRACTICAL NURSE (continued)

essential(s)	failure(s)	flexed	gain(ing)
estimates	fairly	flexible	gallbladder
etc.	falls	floors	gases
ethical	false	flow	gauze
ethmoid	familial	fluid*(s)	generalize
eustachian	familiar	flush(ed)	generated
evacuate	families	fly	generation
evaluate	fast	focal	genetic(ally)
evaluation	fasten(ed)	focus	genital(s)
evasive	(s)	fold(ed)	gentle
event	fat	(s)	gently
exact(ly)	fearful	folks	germicide
examination	fed	follicles	girth
examined	feeding	follow(s)	giving
examples	feelings	foods	gland(s*)
exceeds	feels	footboard	glass
excess(ive)	female*	forced	glove
excreta	femoral	forcing	glucose
excretory	fetal	forgot	gluteal
excuse	fetus	formal	glycerol
exercise	fever	formation	goals
exerted	fibers	formulas	gonococcus
exhibits	fibrotic	forth	gonorrhea
exist(ing)	fibrous	fortunately	goodness
exit(ing)	fifth	forty	gown
(s)	fifty	fosters	gradual
exocrine	fill(ed)	foundation	graduate
expiration	(er) (ing)	fracture(s)	gram
explain	filter(ing)	frame	grandparent
explanation	financial	framework	grapefruit
expose(d)	finding	frank	graphs
(s)	finish(ed)	freely	gravity
exposing	finite	freeze	greatest
expressed	firmly	freezing	greatly
extend(ed)	firmness	frequency	greenish
(ing) (s)	first aid	frequent(ly)	grounds
extension	fishworm	frustration	groupings
extra	fist	fulcrum	grow(n)
extreme(ly)	fit(s)	functional	guard
extremities	fix	functioning	guide
faces	(ed)	functions	guideline(s)
facial	flakes	fundamental	gurgling
facilitate	flash	fungi	habits
facility	flat(tens)	furnishing	halter
factor(y)	flatus	fusses	hammer

LICENSED PRACTICAL NURSE (continued)

hamper	hygiene	infant(s)	internal
handle	hyper	infarction	interpersonal
hang(s)	hyperalimentation	infect(ed)	interpret
harmony	hyperextend	infection*(s)	interrelation
hasten	hypersensis	(ious)	interruption
hazardous	hyphen	infective	intervals
hazards	hypothalamus	infestation	intervertebral
headache	hysterectomy	inflammation	interview
heal(ing)	iv	inflammatory	intestinal
hearing	ice(d)	inflow	intestine
heat(ed)	identify	influenced	intolerance
heavily	iliac	inform(ed)	intrauterine
heel	ilium	infraction	intravenous
helped	ill	infusion(s)	introduce(d)
helpful	illegal	ingested	introduction
helping	illness(es)	inhabit	introductory
helps	illustrate	inhibit(s)	invade(s)
hemolytic	imbalance	initial(ly)	invasion
hemorrhage	immediately	initiate(d)	invention
hemothorax	immobilize	initiative	inventory
hence	immunization	inject(ed)	involve(ment)
hereditary	impaired	(ion) (s)	(s)
highly	impending	injuries	involving
hinder	implies	injury	inward
hip(s)	improper	inner	iris
holder	improve(s)	insert(ed)	irregular
holding	improving	(ion)	irreligious
holes	impulses	inspect	irrigation
holidays	incapable	inspiration	irritable
homemakers	inch(es)	inspired	irritating
hopper	incident	instant	irritation
horizontal	incise	instituted	itching
hormone(s)	incision	institution	item
hose	included	instruct(ion)	jams
hospitable	includes	(or)	jaw
hospitalize	incoming	instrument	jeopardize
hospitals	incompatible	insulin	joins
host	increases	insure	joint(s)
housekeeping	increasing	intact	judgment
humidity	independent	intake	juice*(s)
hundreds	index	intent	jump(ing)
hungry	indicate	interfere(nce)	keeping
hurried	indicating	(s)	key(s)
hurt(ing)	indication	interior	kidneys
(s)	induces	interlacing	kilo

LICENSED PRACTICAL NURSE (continued)

kin	ligaments	maintenance	medium
kinds	lightest	maker	medulla
knee	lightning	male	membrane(s)
knitting	lights	maleus	meningeal
knob	limb	malignancy	meningitis
knowledgeable	limiting	malignant	menstrual
lab	limits	malnourish	menstruation
labeled	lined	malnutrition	mental
laboratory	linen(s)	malunion	messages
laboring	lining	manage(d)	metabolic
lace	linked	manifest(ation)	metabolism
lacrimation	linking	(ed)	metal
lag	liquid(s)	mankind	meter
laid	liver	manual	micro
lanolin	lobe(s)	mark(ed)	microorganism
lap	localized	marriage	microphone
largely	locate(d)	masceration	microscope
larynx	location	massage	microscopic
latent	lock(ed)	mastectomy	mild
lateral(is)	(ing) (s)	master	mineral(s)
(ly)	locomotion	mastoiditis	minimal
laundry	lodged	mate	minimum
laws	longterm	materials	minister(s)
laxatives	loneliness	matted	mino
layer(s)	loose(ly) (n)	mattress	minute
leader	lose	mature	misc.
leading	losing	maxilla	mitochondria
leads	loss	maximum	mix(ed)
leeches	lotion	meals	mobility
leg	loud	meanings	moderate
legal(ized)	LPN	meantime	modification
legislature	lubricant	meanwhile	moist(ening)
legs	lubricate	measure(d)	(ens)
lengths	lubrication	(s)	(ure)
lengthwise	lues	measurement(s)	molecules
lesions	lumbar	measuring	monitoring
lessons	lumbosacral	meatus	mopping
lets	lumen	mechanical	motion
letting	lump	mechanics	motor
levels	lung(s)	mechanism	mouth*
lever(s)	lymph	media	movements
licensed	lysis	medically	mucosa
licensure	machine	medicated	mucuous
lifesaving	maintain(ed)	medication*	multiply
lift(s)	(ing) (s)	medicine	muscle*(s*)

LICENSED PRACTICAL NURSE (continued)

muscular	obstetrical	oxygen(ation)	Peristalsis
muslin	obstruct(ed)	pace	personality
myasthenia	(ion)	packet	personnel
myocardial	obtain(ing)	pain*(ful)	perspiration
mysteries	obvious	palate	persuasion
narcosis	occipital	palpate	pertaining
narcotic(s)	occupies	palpation	phagocytes
nasal*	occur(s)	pancreas	pharmacology
nationally	o'clock	pancreatic	pharmacy
nausea	ocular	panel	pharynx
neck	offer(ed)	pap	phase
needle*	official(s)	paralysis	philosophy
neglect(ed)	offspring	paralyzed	phonation
neonatal	oil(s)	parasitic	physically
neurotic	ointment	Parkinson's	physician*(s)
nodes	olfactory	partial	physiological
non	opening(s)	participate	physiology
nonenergy	operated	particles	pills
nonofficial	operations	partition(s)	pin
nonprofessional	operative	pass(ed)	pinworm
nonprofit	opposite	(es) (ing)	pitcher
nonstimulating	optic	passage(way)	pituitary
normally	optimal	patch	placement
nose	optional	pathological	plain
nostril(s)	oral(ly)	patient*(s*)	plasma
notch	ordered*	patterns	pleural
notebook	orders*	pause	plug
noted	ordinarily	pectoral	plunged
notice	ordinary	pediatric	pm
notify	organ(ism)	pelvic	pneumonia
nourishment	(isms) (ized) (s)	pelvis	pneumothorax
nowadays	oriented	penicillin	pocket
nucleus	ortho	percent	pointed
nurse*(s)	orthopedic	perforation	policies
nursing	otitis	perform(ed)	polio
nutrients	outer	(s)	polluted
nutrition	outflow	perineal	pons
object(ive)	outlet	periodic	poorly
(s)	output	periods	port
obliged	outward	peripheral	portal
observant	oval	peritoneal	portion
observation	ovaries	permanent	positioned
observe(d)	ovary	permit(ted)	positive
(s)	overhead	perpendicular	possibility
observing	oxidize	persist	postals

LICENSED PRACTICAL NURSE (continued)

posted	producing	raise	regardless
posterior(ly)	profuse	ranks	regimen
posture	project	rapid(ly)	region
potions	prolonged	rash	registered
pounded	promptly	rattle	registration
pour(ed)	prone	ray(s)	regular(ly)
(ing)	proper(ly)	reaching	regulated
practical	proportion	reactions	regulates
practice(d)	protect(ed)	reacts	regulating
(s)	(ive) (s)	readily	regulation
practicum	protein(s)	readings	rehabilitate
precaution	proven	readjustment	rejected
preceded	provides	realize	related
precedes	psyche	rear	relation
precipitation	psychiatric	reasonable	relationship
precision	psychological	reasons	relatively
predispose	psychosis	reassemble(d)	relax
prefer(able)	psychosocial	recall	release(d)
(s)	psychosurgical	receptacle	releasing
prefix	pubic	receptors	reliable
pregnancy	publicized	recognition	relieve(d)
preigniting	pulley(s)	recommendation	religions
premium	pulmonary	recommended	remain(s)
preoperation	pulsation	recorded	remedies
preparation	pulse	recorder	remote
prepare(d)	pumped)	recordings	removable
(s)	(s)	records	removal
prepping	punch(ed)	recovering	remove(d)
prescribed	puncture	recovery	removing
preserve	pupil(s)	rectal	render
preset	purge	rectum	renewing
pressed	purulent	recumbent	rented
pressures	pus	recurrence	repaired
prevent(ative) (ed)	push(ed)	reduce(d)	repeat
(ing) (ion) (s)	(ing)	reestablish	replace(d)
previous(ly)	pushbutton	refer(ence)	replacing
primary	qualification	(red) (ring)	replenish
prior	qualities	refill	reports
privacy	quantities	reflect	represent
probe	quantity	reflex	reprocessed
procedure*(s)	rack	refrigerate	reproduction
proceed	radial	refusal	request(ed)
processed	radiation	refuse	(ing)
processes	radical	regarded	require(ment)
produce(s)	radiopaque	regarding	(s)

LICENSED PRACTICAL NURSE (continued)

requiring	rubella	sensitive	skin*
requisition	rudimentary	sensitivity	skull
resembles	ruled	sensor	slack
resembling	rules	sensorium	slept
reserve	ruling	sensory	slight(ly)
reservoir	rupture	separate(d)	sling
resident	rural	(ly) (s)	sloughs
residual	sac(s)	Septisol	smear
resist(ant)	sacrament(s)	septum	smell
(ing)	sacrolili	sequelae	smoke
resources	sacrum	sequential	smooth(ly)
respects	safe(ly)	seriously	snapped
respiration	(ty)	serum	sneezing
respirator	saline	severe	sniffed
response(s)	salivary	severed	soda
responsible	salts	shake(s)	solid
restore(d)	sample(s)	shaking	solution(s)
restoring	sampling	shape(d)	solvent
restrain(ts)	sanguinous	shaved	soma
restrict(ed)	satisfaction	sheath	somatic
resulted	satisfied	sheds	sophisticated
resulting	scab	shields	sore
retained	scale(s)	shift(s)	source
retardation	scar(red)	shock(ed)	spare
retention	scars	shortened	spasm(s)
reticulum	schedule	shorter	speaking
retina	sciatic	shoulder	specialize
retroperitoneal	scientists	showing	specialty
review	scopes	shredded	specifically
rheumatic	screen	shrouded	specified
rhinitis	screw	sick(ness)	specimen(s)
rhythmical	sealed	siderails	spectacular
rib	search	sight	spectrum
ribosomes	seat	sigmoid	spinal
ringers	sebaceous	sign(ed)	spirits
rinse(d)	secondary	(ing) (s)	spiritual
rinsing	seconds	signal	spirochete
risk	secretion(s)	signature	sponge
robe	sections	significant	spontaneous
role	select(ed)	sinuses	spread(er)
roots	(ion)	site*(s)	stable
rooted	semi	situations	staffed
roughage	semiliquid	skeletal	staffs
route(s)	sensations	skill(ed)	standards
routine	sensing	(ful) (s)	standing

LICENSED PRACTICAL NURSE (continued)

stands	subside	tablets	towel(s)
stapes	substance(s)	tape(d)	toxic
staphylococcal	suffer	task	toxins
statistics	sufficient	taut	trachea
status	suffix	technician	tract(ion*)
stays	suggestion	technique(s)	transfer(red)
steady	suitable	techs	transfusion
stenosis	suited	temp.	transient
stenotic	suites	temporal	transmission
sterile	sum	tempting	transmitted
sterility	summary	tends	transport(ation)
sterilized	super	tens	transverse
stethoscope	superior	tension	trapped
stimulate(d)	superstition	term	trauma
stimulating	supervision	terminal	traveled
stimulation	supervisor	termination	travels
stoma	supine	terribly	tray
stomach*	supplied	tertiary	treating
stool(s)	supplies	testing	treatments
(ing)	supply	tests	treelike
stopper	supported	thalamus	triglycerin
storage	supporting	therapies	trillionth
stored	supports	therapy	trimester
storeroom	suprarenal	thermometer	trip
stove	supreme	thermostat	trochanter
straighten	surgeon	thickened	troughlike
strain(ing)	surgeries	thicker	trunk(s)
(s)	surgery*	thigh	tube*
strands	surgical	thin	tubing
strata	surround(ing)	thoroughly	tumor
streptococcus	susceptible	thousand(s)	turning
stretch(er)	suspected	threading	tympanic
(ers) (es)	swab	threadlike	typical
strikes	swallow(ing)	threat	ulcer
strip	(s)	thrive	ulnar
strives	swelling	throat	unauthorized
stroke	symptomatic	thyroid	uncomfortable
structors	symptoms	tilt	uncommunicable
structure*(s)	synchronize	tissue*(s)	unconstitute
studies	syndrome	title	underlies
stunted	Syntex	toe(s)	undermoulish
stupor	synthesize	toenails	undertaken
subclavian	syringe	tongs	undressing
subjective	systematic	tongue	undue
subsequent	systole	tooth	unequivocal

LICENSED PRACTICAL NURSE (continued)

unethical	vacoliter	vibrating	watery
unfastened	vacutainer	vibrations	weakening
unfastens	vagina	vicinity	weakness
unique	vaginal	vigorously	wear
unit*(s)	valid	violating	weaving
unlock	valuable	visible	weekly
unnecessary	(s)	vision	weight
unnoticed	valve	visitation	(s)
unpleasant	variations	visiting	wheelchair
unplugged	variety	visitors	wheels
unprotected	vary	vital	whereas
unreasonable	vein	vitamin	whitish
untold	venereal	vocal	widespread
untreated	ventricle(s)	voltage	withdraw
upright	ventricular	voluntary	wither
upset(ting)	verify	volunteers	witnessed
urge	vermicular	vomit	witnessing
urinal	vertebrae	(ing)	wondering
urinary	vertically	voxiderm	worm(s)
urine	vessel(s)	wards	worn
uterine	via	warning	worried
uterus	viability	wash*	worry
utility	vial	waste	worth
vaccine	vibrates	watched	wound

HIGH FREQUENCY WORDS MACHINE TOOL OPERATOR

ac	diameter	measure	round
base	draw	measuring	scale
cable	(ing)	metal	screw
caliber	eight	meter	sheet
capacitor	elevation	micrometer	shows
check	equal	miter	shunt
circuit	fig.	motor	steel
clamp	fixture	patterns	success
coil	gauge	pick	switch
connected	(s)	pieces	taper
crisis	generator	pipe	tool
degrees	holes	plug	(s)
depth	inch(es)	remove	vertical
develop	machine	rod	voltage

TECHNICAL VOCABULARY MACHINE TOOL OPERATOR

abilities	arranged	cable*	cone
ability	arrangement	calibrating	connect(ed*)
abnormal	aside	centers	(ing) (ion) (or)
ac*	assembled	centrifugal	(ors) (s)
accident(s)	assistance	characteristic	consecutive
accomplish	assistant	charged	consist(ent)
accordance	associated	charges	(s)
accuracy	attach(ment)	charter	constant
accurate	attaining	chased	constructed
achieve(ment)	attempt	check*(ed)	constructing
acidic	attitudes	(ing)	contact
actual	attracted	cheek	contained
adaptable	attributed	chimney	container(s)
adjust(ment)	automated	choosing	continuous
adopted	automatically	circle(s)	contribute
advantage(s)	automobile	circuit*(s)	controlled
advent	avoid(ed)	circulate(s)	controls
adverse	aware	circumference	convenience
advice	backout	clamp*	convenient
affect(s)	balance(d)	classification	conversion
align(ment)	ballast	clean(ing)	copper
allowances	base*(s)	clearance	cord(s)
allowed	battery	cleats	core
alternator	bearing(s)	code	corners
altitude	behavior*	coil*(s)	corrected
aluminum	bellhousing	coincides	correspond
ammeter	biological	collar	corridor
ampere(s)	bisect(ing)	collision	costly
analyze	(ors)	columns	counter
ancient	bit	combination	creates
angle(d)	blade	compared	crises
(s)	blanks	compass	crisis*
anticipate	blew	compensate	crisscross
anvil	block	completed	critical
apart	bobbin	completing	crosses
apathetic	bolt	complex	cured
appearance	bore(d)	compliment	curved
appendices	boring	composition	custom
appliances	boss	compound(ed)	cutting
application	bottle	compressor	cycle(s)
applies	branch(es)	computer	cylinder(s)
apply	breaker	concentrate	damage
approximate	breaking	condition(ed)	damp
arc	bushings	(ing)	danger(ous) (s)
armored	buyer	conduct(or)	decimal(s)

MACHINE TOOL OPERATOR (continued)

deck	draftsman	establish	financial
decrease	drain	etc.	finer
defining	draw*(ing*)	evaluates	finish(ed)
definite(ly)	(n) (s)	evenly	fit(ted)
degrees*	dress	eventually	(ting)
denominator	drill(ed)	evident	fix(ed)
depend(ent)	driver	exactly	(ture*) (tures)
(ing) (s)	drives	examples	fluctuating
depth*	driving	excel	flux
derived	drop(ped)	executive	focus
describe	duct	exert	forced
designer	dynamic	existing	four way
desired	effectively	expanded	fours
detect	effectiveness	expense	fourth
determine	eight*	expensive	fractional
develop*(ing)	(een)	experience*	fractions
(s)	(hs) (y)	experiencing	frame(s)
device(s)	elbow(s)	experiment	frequently
diagonal(ly)	electric(al)	expert	frictional
diameter*(s)	(ian)	explain(ed)	frustrated
diamond	(ity)	exposed	frustrating
die	electromagnet*	expression	functional
dielectric	electrostatic	extend	functioning
differ(ently)	elevation*	extension	fuse(d)
diminution(s)	eleven	extensive(ly)	gable
directions	emphasis	exterior	gallon
disagreement	employed	external	gases
disassociate	enclosed	extra	gassed
discharges	ended	extremely	gauge*(s*)
disconnect	ends	faced	gear
discovered	energized	factor	generated
discussed	energy	failure	generator*(s)
discusses	engage(s)	familiar	glandular
discussing	engines	farad	gradual
disintegrate	enhances	fashioned	graduated
disorder	enters	fastened	graduation
disputable	environment	fault	greatest
distance	equal*(ized)	favor(able)	grind(er)
distinct	(s)	feed	groove
distinguish	equipped	fields	grounded
distracted	equivalent	fifteen	grounding
disturbed	erase	fifty	grow(s)
divide	erect	fig.*	guard(s)
divisible	essence	figured	guess
divisions	essential(ly)	filed	guide(lines)

MACHINE TOOL OPERATOR (continued)

guy	inductor	levers	milliampere
habits	influence(s)	lifetime	mini
hammer	inner	limit(s)	minor
handle(d)	inquiry	linear	minute
handling	inserted	liquid	mishandled
handout	inspecting	load(ed)	misused
happen(s)	inspection	(ing) (s)	miter*(s)
hardened	installation	locate(d)	model
harm	instance(s)	locating	modify
hazard	instant	location(s)	moldings
heads	instructor	locator	molecules
heat(ed)	instrument	lock(ed)	momentary
(ing)	insulation	(ing)	momentum
heel	insulator	logical	motor*(s)
height	insurance	loss(es)	mounted
hide	intense	lowest	multiple
highest	intensity	machine*(s)	nearby
highly	interact(ion)	machining	necessarily
holds	interchange	machinist(s)	negative
hole(s*)	intermediate	magnet(ic)	neutral
homes	internal	(s)	nine(ty)
horizontal	interrupted	magnetism	numbered
horsepower	intersect(ed)	magnetized	numerators
household	(ion)	maintain(ed)	numerous
humor	interwoven	manager	obtain(ing)
identified	invention	manufacture	occupation
identity(ing)	involve(ment)	mark(ed)	occurs
illustrate	(s)	materials	octagon
imbalance	irregular	math	offers
immeasurable	jacket	maximum	officials
immediately	jarred	measure*(d)	offset(ting)
improperly	jarring	(ment) (ing*)	oil
improved	join(t)	mechanical	older
inability	judging	mechanism	opening(s)
inaccurate	keeper	medium	operate
incessantly	knurled	mental*(ly)	operations
inch*(es*)	lapped	mercury	operator
included	lathe(s)	message	opposite
includes	leakage	metal*	ordinary
increases	leg(s)	meter*(s)	original
increasing	legal	metric	outer
independent	lengths	microampere	outlet(s)
index	lessen	micrometer*	outline
indicates	lesser	microphone	output
induce	leverage	mill(ing) (s)	overheat

MACHINE TOOL OPERATOR (continued)

overlapping	processes	remodeling	screw*(ed)
oxygen	produced	remove*	(s)
pace	profile(s)	repelling	scribed
panel	project(ing)	repetition	script
papers	(ion)	replaced	sealed
parallel	proper(ly)	represent	seam
patterns*	protect(ion)	(ation)	secondary
perception	(ive)	(ed) (s)	sections
permit(s)	provides	require(ment)	secure
perpendicular	quarter	(s)	security
phase(s)	quick(ly)	resetting	seek(ing)
physically	radius	resistance	seethe
physiological	raised	resolve	segments
pick*(ed)	rapid(ly)	resolving	seizing
pieces*	rated	resources	seldom
pilots	react	respective	semicircle
pipe*(s)	readily	respond(s)	semidiameter
pivots	readings	responsible	semiprofile
planers	ream	resulting	senses
planes	rebuilt	reverse(d)	sensory
plate(s)	receive	reversing	separate
plug*(s)	recess	review	separating
pole(s)	(es)	revolution	separation
porcelain	recognize(s)	ridiculous	separators
portable	recognizing	ring(s)	seventy
portion	recorder	rod*(s)	severe
positive	rectangular	rolled	shape(s)
potential	reduce	rotation	sharp
pound(s)	reduction	rough	shield
practice	reevaluation	round*	shipping
preceded	refer(s)	row	shock(ed)
precision	refrigerate	rpm	shop
predict	regardless	rule	shoulder
preferred	registered	runs	showing
preheat(s)	regrind	safely	shows*
preliminary	regular	safety	shunt*(s)
prepare	regulate	sample	signal
presented	regulating	satisfied	signed
prevent	regulator	satisfies	significant
previous	related	satisfy	sill
primarily	relation(ship)	savings	similarly
principles	relatively	scale*	simultaneous
printed	release	scientists	sixteenth(s)
probability	relying	scoop(s)	sixty
proceed	remedied	screen	sized

MACHINE TOOL OPERATOR (continued)

sizes	stick	tester	unpleasant
skid	stimuli	theories	upper
skilled	stimulus	thereby	vacation
skim	stops	thimble	valve
slick	stored	thirty	variation
slides	storing	throttle	varied
slight(ly)	strengths	thrown	varies
sling	strictly	tickets	variety
sloppy	striking	title	vary(ing)
slots	strip	tolerance	vernier
slotted	struggling	(s)	versus
socket(s)	strung	tolerate	vertical*
soft	stud	tolerating	viewed
solid	substance	tool*(s*)	volt(age*)
solution	substitute	(room)	(s)
solved(d)	success*(ful)	torque	volumes
solving	surge	totaled	wait
sounding	suspended	trace(d)	waste
source	switch*(es)	transfer	watt(s)
spaces	symmetrical	transition	weakened
spare	synchronous	transmission	wear(ing)
speaking	synonymous	transmitted	weights
specifically	tables	treated	weld(er)
speed(s)	tangent	triangle(s)	wheel(s)
spend	tape	trigger	whereas
spin	taper*(ed)	trip	width
spindle(s)	(ing) (s)	truck(ing)	wind
splice(d)	taping	(s)	wire
(s)	taps	trust	wiring
split	task(s)	turning	wise
squared	taut	turns	withdrawal
stages	telescopic	turret	workable
stamped	tempered	twentieth	worker
standards	tend(s)	twenty	(s)
starter(s)	tension	twisted	worn
starting	terminal(s)	unit(s)	wound
starts	terminated	(y)	wrapper
steel*	tested	unknowns	zero

HIGH FREQUENCY WORDS SECRETARY

address	credit	learn	regular
administrate	curriculum	libraries	remission
alphabetic	date	library	request
application	director	mail	resources
appropriate	edge	management	responsible
approval	employee(s)	materials	rules
approved	excused	memorandum	semester
arrangement	extended	objectives	serve
assistant	fee(s)	officer	signed
attendance	file	participate	storage
carbon	filing	permission	supervisor
card	fill	personnel	supply
clerical	film	please	thinner
communicate	folder	principal	touch
conference	guides	procedure	transportation
contact	included	profession	travel
coordinator	index	proper	trip(s)
copies	initials	proposal	typing
copy	instruction	recommendation	unit
courses	lacquer	records	write

TECHNICAL VOCABULARY SECRETARY

abbreviate	aims	assessment	bulletin
abbreviation	aligned	assigned	bureau
abilities	alignment	assignment	bursar
ability	alleged	assist(ance)	business(es)
abroad	allotted	(ant*) (s)	byproducts
absence	allowance	associate	calculated
academic	allowed	assume	cancel(ed)
acceptable	allowing	assumption	(ing)
access(ion)	allows	assurance	capabilities
accidents	alphabet(ic*)	assure	caption
accommodate	alternated	assuring	carbon*
accompany	amended	attempt	card*(s)
accomplish	analyze	attend(ance*)	(board)
accordance	angles	(s)	carrier(s)
accountant	announcement	attorney	carries
accounting	anticipate	attributes	carry
accustomed	anticipation	audio	carton(s)
achieve	apostrophe	(visual)	cassette
acknowledge	apparent	audit(ing)	catalog(ing)
acquisition	appearing	augment	(s)
active(ly)	appears	author	centered
adding	appendix	automatic	centers
addition	applicable	avoid(ing)	certificate
address*(ee)	applicants	award	certified
(ing)	application*	baggage	certify
adequate	applies	balance	channels
adjunct	apply(ing)	band	characteristic
adjusting	appointment	basically	chargeable
administer	appreciable	bear(ing)	charged
administrate*	appropriate*	becomes	charges
admire	approval*	begin	charts
admissions	approved*	behavior	check(ed)
admit(ted)	approves	believed	(ing)
adopt(ed)	approving	benefit(s)	chemical
advance(d)	aptitude	biased	chip
advantages	archival	bids	chosen
adversely	archives	biweekly	chronological
advisors	arise	blank	circulation
affected	arrange(ment*)	block	circumstances
agencies	arrival	blower	citation
agency	artisans	bonds	classification
agents	aside	bookkeeping	classified
agreed	aspect(s)	books	classify
agreement	assembly	borrowed	clerkal*
aids	assessed	boss	clerk

SECRETARY (continued)

clients	considerable	dear*	disapproving
code(d)	considerate	decide	disc
cognizant	considering	decimal	discarded
collection	consistent	declared	discern
colon	construed	decrease	discontinuous
combined	consult(ed)	deemed	discriminate
combines	(ing)	defined	discuss(ed)
comma	contact*	defines	displays
commerce	container(s)	definition	disposal
commercial	containing	delivery	disposing
commitment	contests	demand	distinctive
communicate*	continually	demonstrate	distribute
companies	continuing	departure	distribution
compared	continuous	depend(ing)	divide
compatible	contraction	(s)	divisions
competence	contracts	depicts	doubtful
competition	contractual	description	duplicate
complaints	convenience	designate(s)	duplicating
completed	cooperative	designer(s)	duration
completing	coordinator*	desired	duties
completion	copies*	desiring	earns
complex	copy*(ing)	desk	ease
compliment	cord	destroy(ed)	easily
component(s)	corporation	detailed	economical
compound	correct(ly)	details	edge*(s)
comprehensive	correspond	detect	educational
comprises	courses*	determiner	educator
computer	coverage	determines	effectiveness
computing	covered	detract	efficiency
concepts	created	detrimental	efficiently
conclusion	creation	develop(ing)	electronic
concrete	credit*	diagonal	eligibility
condition	critical	dictate	eligible
conduct	crumpling	dictating	emergencies
conference*	cultural	dictation	emphasis
confirmed	cultures	dictionaries	employed
conflict	current	dictionary	employee*(s*)
confuse	curricular	differentiate	employer
confusion	curriculum*	diploma	employing
connected	customer	directed	employment
connecting	danger	directions	encompass
conscious	dash	director*(s)	encourage(d)
consecutive	date*(d)	(y)	engaged
consent	(s)	disadvantage	enhance
consequence	dealt	disapproval	enlightened

SECRETARY (continued)

enrich	fee*(s*)	headset	inform
enroll(ed)	file*(d)	helping	(al)
(ing) (ment) (s)	(s)	hesitate	inhalation
enterprise	filing*	highly	initial(s*)
entrusted	fill*(ed)	hired	initiated
envelope(s)	film*	hiring	insert(ed)
equipped	financial	holder	inspect(ion)
equivalent	firmly	holdings	institutes
errors	firms	holds	instruction*
establish(ing)	flammability	homes	instructor
etc.	flammable	hone	insurance
etiquette	flaws	hourly	insured
evaluated	folder*(s)	hub	integrated
evaluation	follow up	hyphen(ated)	intended
event(s)	forwarded	(ation)	intense
exact	fourth	identical	intent
examination	framework	identification	intercom
examiners	frequent(ly)	identified	interested
examples	fulltime	identifies	interfere(nce)
excellent	fully	identify(ing)	interoffice
exception(s)	functions	illustrate	interpretation
excess	gained	illustrating	interstate
excused*	gallon	illustrator	interview(s)
executive	geographic	implementation	inventory
exhaust	goal(s)	implies	investigate
exist	governed	improve(d)	invitation
expanded	governing	(ment)	involves
expecting	grade(d)	improving	involving
expects	graduate(d)	inactive	isolated
expense(s)	grammatical	inadvisable	item(ized)
expensive	granted	inch	itinerary
explain(ed)	graphics	included*	joint(ly)
extended*	graphs	includes	jurisdiction
extends	guarantees	incorrectly	justification
extension	guidance	increases	juvenile
extra(s)	guide	indefinite	label(s)
extreme	guideline(s)	independent	lacquer*
facilities	guiding	index*(ing)	laundry
factor(s)	handling	indicate(s)	lawyer(s)
factory	handwriting	indicating	leading
familiar	happen	indication	learn*(ing)
faults	harassment	indicator	legal
feasible	hazardous	indirect	legitimate
features	heading	inferior	letterhead
federally	headquarters	influences	levels

SECRETARY (continued)

libraries*	misfiling	ordinarily	planned
library*	misspelled	ordinary	please*
lifting	misunderstood	organized	pleasure
likelihood	mixed	organizer	policies
limit(ed)	motion	orientation	portable
liquid	multiply	orienting	portion
listed	mutual	origin	positions
listings	narrow	original	positive
locally	necessarily	outcomes	postal
located	necessity	outline(d)	practical(ly)
location(s)	neglect	overall	practice
lodging	negligence	overhead	precaution
logical	nondiscriminate	overlook	preceding
machine(ry)	normally	overnight	predetermine
(s)	notations	overtime	preface
mail*(ing)	noticeable	paced	preferred
maintain(ed)	notification	packages	prefixes
(ing) (s)	notify(ing)	parentheses	preliminary
manage(ment*)	noxious	partial	premises
(r)	numbered	participant(s)	prepare(d)
manual(ly)	numeric(ally)	participate*	(s)
margin	numerous	particles	preservation
mark(ed)	objectives*	partners	pressboard
(er) (s)	obscured	pass	presuppose
materials*	obtain(ing)	payable	prevent(s)
maximum	occasion	payment	primarily
measure(ment)	occupation	percent(age)	primary
(s)	occupies	perfection	principal*(s)
media	occupy	perform(ing)	principles
meetings	occur	periodic(al)	printouts
memorandum*	offer(ed)	periods	prior(ities)
memorize	(ings) (s)	permanent(ly)	privileges
memory	officer*	permission*	procedure*(s*)
mention(ed)	offices	permitted	processing
merchandise	official	personally	producers
merit	offset	personnel*	product(ivity)
message	omit	pertaining	profession*
microfilm	ongoing	petition	programed
microforms	opening	philosophy	project(ion)
microrecord	operated	photograph	(s)
mimeograph	operator	phrase(s)	promotion
minimum	optional	pictured	pronounced
minute	ordered	pictures	proof
miscellaneous	orderly	placement	proper*(ly)
misfiled	orders	placing	proposal(s)

SECRETARY (continued)

proposed*	referring	schedule(d)	speaking
protect(ion)	refiled	(s)	specialist
prove	reform	scholar	specialize
provides	refrigerate	sciences	specialities
providing	refund	script	specifically
provisions	regarding	sealed	specified
publication	region(al)	searcher	spelled
punctuation	registered	seats	spelling
pupil(s*)	registers	secondary	spending
purchase	registrar	secretarial	sponsored
purchasing	registration	sectional	sponsors
purposes	regular*(ly)	sections	spouse(s)
purposive	regulated	secure(d)	staffed
qualification	regulation	security	stamped
qualified	regulator	selection	stamps
qualify	reimbursement	semester*(s)	standards
quantities	requires	semicolon	standpoint
quarter	requisition	seminar(s)	stapler
quick	resemblance	sender	static
quotation	reserve	sending	status
quoted	resident	sentence(s)	stimulating
radius	resource(s*)	separate(ly)	stocks
rapidly	respective	sequence	storage*
rarely	response	serve*(s)	store(d)
rates	responsible*	session(s)	storing
reaches	restriction	setting	stress(ed)
reader(s)	retaining	sign(ed*)	stripes
reality	retention	(ing)	strips
reasonable	retired	signal	studies
receipt	retrieval	signature(s)	styles
receive	returning	significant	subcontract
receiving	returns	signify	subdivided
recognize	review(ed)	sincere(ly)	subdivision
recommend(ation)	(ing)	situations	subjects
(ed)	reward	skilled	submission
recordings	ridding	skills	submitted
records*	rival	slash	subscribe
recreation	role	slight	subsequent
reduce(d)	routes	slip(s)	substitute
reducing	rule(s*)	smudges	substitution
reduction	salary	smudging	subsystem(s)
reference(s)	salutation	solve	succeeding
referencing	satisfaction	sought	success
referral(s)	satisfactory	spaces	sufficient
referred	satisfy	sparingly	suggested

SECRETARY (continued)

suggestion	text	uncertain	visible
superintendent	thoughtful	(ty)	visiting
superior	thoughts	underlies	visitor
supervise	title(s)	underneath	visual(s)
supervisor*	totally	understood	vocabulary
supplies	touch*	undertaking	void
supply*	toxic(ity)	unexcused	volumes
supporting	trades	unique	wage(s)
suppose	transfer(red)	unit*(s)	weight
suspects	translucent	unjustifiable	widely
suspicious	transmitted	unless	wider
suspicious	transparent	unusual	width
systematic	transportation	utilization	willful
tab(bed)	travel*	utilized	winter
(s)	trend(s)	vacation	wishes
takes	trip*(s*)	valuable	wishing
tape(d)	truly	valued	withdrawing
target	trustees	van	workable
tasks	tuition	varies	workplace
teacher(s)	typed	variety	workshop
telegram	typewriter	vastly	wrinkle
telephone	typewriting	vendor	(d)
temporarily	typical	verified	wrinkling
temporary	ultimate	verify	write*(rs)
tendency	unable	viewer	(s)
terminate(d)	unacceptable	violation	yesterday
testing	unbroken	visa	yours

HIGH FREQUENCY WORDS WELDER

ac	electric	metal	root
acetylene	electrode(s)	meter	shock
angle	flame	motor	shows
arc	flat	natural	shunt
argon	flow	oxygen	speed
base	fusion	pass	starting
bead	gas	penetration	steel
burn	gauges	phone	switch(es)
cable	generator(s)	pipe	tape
carbon	heat	plate(s)	tip(s)
circuit	horizontal	polarity	torch
coil	hose	pole	travel
connected	inch	produce(d)	unit
copper	iron	properties	valve
correct	joint(s)	puddle	voltage
cutting	lamp	resistance	weld(ed)
dc	load	reverse	(ing)
degrees	magnet(ic)	rod(s)	wire

TECHNICAL VOCABULARY WELDER

abbreviate	armored	breathe	chancing
absorbs	arrange(ment)	brick	characteristic
ac*	arrow	bridge	charged
accessible	asbestos	broken	charging
accidental	associated	bronze	charges
accomplish	atmosphere	buddy	chart
accounts	atmospheric	build(up)	check
accumulate	atomic	built	chemical(ly)
acetone	attach	bulb	chill
acetylene*	attempt(ing)	burn*(ed)	chipping
acidic	attracted	(ing) (s) (t)	circuit*(s)
acting	automatic	buttons	circulate
acts	avoid(ed)	buy(ing)	clamping
actual	backfire	buzz	clap
adapted	backing	cable*(s)	classes
add	backup	cadmium	classification
address	balanced	calcium	clean(ed)
adjust(ment)	ballast	calibrated	(er)
advantage(s)	band	calls	clearance
advisable	bar(s)	cam	cleats
affected	bare	canvas	clockwise
affects	base*	capacitance	clogged
airplanes	bath	capacitor*	coated
alignment	battery	capacity	coating
allow(ed)	bead*(s)	carbon*	code
(ing)	bearings	card(s)	coil*(s)
alloys	beat	careful	collect
alternating	bellhousing	carpet	colorless
alternator	bessemer	carries	column
aluminum	beveled	carry(ing)	combination
ammeter	bit	carved	combines
amounts	bite	cassette	combining
ampere(s)	blank	cast(ings)	combustion
analyze	blow	cat	commercial
angle*(s)	bobbin	catch	commutator
apart	booklet	category	compensate
appearance	boss	cathode(s)	completed
appliances	bottom	caused	complicate
application	bought	causes	composed
appreciation	box(es)	ceiling	composition
appropriate	brass	centerline	compound(ed)
approved	braze(d)	centrifugal	(s)
approximate	brazing	chain	compress(ed)
arc*(ing)	break(er)	chamber	(or)
argon*	(ing)	chances	computer

WELDER (continued)

concentrate	cycles	drill(ed)	explosion(s)
condition(ed)	cylinder(s)	ductility	explosive
(ing)	damage	duty	exposed
conduct(ive) (or)	dangerous	ease	expressed
cone	dc*	easier	extend
confined	debt	eats	extensively
confused	decimal	economical	external
connect(ed*)	deck	edge(s)	extreme(ly)
(ing) (ion) (or)	decrease	efficient(ly)	fabricating
(ors) (s)	defective	elbow(s)	facets
constant	definite	electric*(al)	factor
constricted	degrees*	(ian) (ity)	failure
constructed	demonstrate	electrode*(s*)	fairly
construction	densities	electromagnet	fashioned
consumable	density	electrons	fast(ened)
contact	depend(ing)	electrostatic	(er) (est)
contained	(s)	eliminates	fatal
container	deposit(ing)	employed	fault(s)
containing	deposition	employer	feather
contaminate	depth	encountered	feature(s)
continuous	designer	ends	fed
contour	desirable	energized	ferrous
contraction	desired	energy	fields
controlled	destroys	engine(s)	fifth
controls	detail	engineering	fig.
convention	develops	enters	figured
conversation	device(s)	equal(ized)	filler
cool(ed)	dial	(s)	fillet
(er) (s)	diameter	equivalent	finest
copper*	dielectric	essence	fitted
cords	directed	essential(ly)	fittings
core(d)	disadvantage	establish	fixed
correct*(ly)	discharges	evenly	fixtures
coupling	disconnect	event(ually)	flame*
cover(s)	discrepancy	evident	flameout
crack(s)	dissolved	exactly	flammable
crane	dissolving	examples	flare
crosses	disturbed	exceed	flashback
crowbar	divided	excess(ive)	flat*
crowned	divisible	exert	flex(ible)
cubic	downhill	exhaust	flints
cuff	downward	existing	flouride
currently	draftsman	exists	flow*
custom(ary)	drag	expansion	fluctuating
cutting*	drawing(s)	explanatory	flush

WELDER (continued)

flux(es)	handle(d)	increases	laboratory
forex	hang	indicate(s)	lamp*(s)
forged	hardening	indicating	lap
formation	hardest	indication	largely
formed	harm	induce	latent
formulate	haul	inductor	layer
fourfold	hazard	inherent	laying
fours	hearing	initial	leak(age)
fourway	hearth	initiates	(ing) (s)
fractional	heat*(ed)	inner	leaves
fracture	(ing)	innovation	leaving
frequency	heavier	input	lecture
frequently	helium	inspect(ed)	leg(s)
friction(al)	helper	(ion)	lenses
fuel	helpful	installation	lesser
fumes	hibond	instance	lever(age)
furnace	highcarbon	instant	lightweight
fuse(s)	highest	instructor	limit(s)
fusion*	highly	insulation	liquifying
gage	highpressure	insulator	litre
galvanized	highspeed	insure	load*(er)
gap	highstrength	intend(ed)	(ing) (s)
gas*	hissing	intense	located
gasfed	Hobart(s)	intensity	locations
gauge(s*)	holder(s)	interchange	machinable
generated	holds	intercom	machine(d)
generator*(s*)	hopper	intermittant	(s)
glare	horizontal*	interrupted	magnesium
goggles	horsepower	invented	magnet*(s)
gouging	horseshoe	invention	magnetic*
grade(s)	hose*(s)	involves	magnetism
grease(r)	household	ionizes	magnetized
greatest	hydrogen	iron*	maintained
grind(ers)	identical	items	maintenance
(ing)	identification	jarred	manganese
grip	ignite	jarring	manually
grooved	immediately	join(ed)	manufacture
grounded	impossible	(ing)	materials
grounding	improperly	joint*(s*)	max
guards	impurities	keeper	maximum
guess	inaccurate	key	measure(d)
guide	inch*(es)	kicks	(ment) (ing)
halfway	inclusions	killed	mechanical
hammer	incoming	kindling	mechanism
handier	incorrect	kink	medium

WELDER (continued)

melt(ed)	operating	pieces	progressive
(ing) (s)	operations	pig	projection
mercury	operator	pin	prone
metal*(s)	opposite	pinpoint	proper(ly)
meter*(s)	ordinarily	pipe*(s)	properties*
metre	ordinary	pitched	proportion
metric	ore	pivots	protect(ed)
microampere	orifice	plate*(s*)	(ion) (ive)
microwire	original	plug(s)	provides
mild	otherwise	plus	publication
millimeter	outlet(s)	pocket(ed)	puddle*
milling	output	(s)	pull(ed)
mishandled	outstripped	poisonous	pumps
mistake	oval	polarity*	purchased
model	overall	pole*	pure
moderately	overhead	porcelain	purify
modernized	overheat(ing)	porosity	purity
modify	overmatch	portable	qualified
molecules	overseas	positioned	ranging
motion	oxidation	positions	rapid(ly)
motor*(s)	oxides	positive	rapidity
mounted	oxidize(d)	pot	rated
movable	oxyacetylene	potential	readily
multiple	oxygen*	practice	realize
narrow	panel	preceding	rebuilt
naturally	parallel	preferable	receive
nearby	partially	preference	recommended
negative	partner	preferred	recorder(s)
neutral*	pass*(es)	preheat(ing)	recovering
nipple(s)	(ing)	(s)	rectangular
nonburnable	patch	preionizes	reduce(d)
nondestruct	path	preparation	reels
nonferrous	peculiar	prepared	refer(s)
nonpressure	penetrate	presents	reference
notice	penetration*	pressures	refrigerate
nozzle	percent	prevent(ed)	registration
nut	perform(ed)	(s)	regular
obtain	permanent	primarily	regulator(s)
occupation	permit(s)	primary	reinforcement
occur(s)	phase(s)	principal	related
odorless	phone*	procedure	relationship
offers	physically	proceed	relatively
oil*(y)	pick(er)	processes	relight(ing)
openings	(up)	prod	relying
operate(d)	pictures	produce*(d*) (s)	removable

WELDER (continued)

remove(d)	settling	stabilization	technique
repair(ed)	severe	stable	tee
repelling	sewing	stainless	tensile
require(ment)	shape(s)	stall	tension
(s)	sharp	stamped	terminal(s)
reset	sheet	stamps	terminated
resin	shield(ed)	standing	testing
resistance*	(ing)	starter(s)	thermal
resists	shipping	starting*	thicker
respiration	shipyard	steel(s)	thickness(es)
respirator	shock*(ed)	storage	thirds
resulting	shows*	store(d)	thorough
reverse*(d)	shrill	(s)	threads
reversible	shrinkage	storing	tinning
reversing	shunt*(s)	straighten	tip*
review	shut	strengths	torch*(es)
rich	signed	striking	track
ricochet	silicon	string(er)	transfer(red)
rivet	sill	strip(s)	transmit(ted)
rod*(s)	sink	strongest	transport
root*	situations	strongly	travel*
rotating	sizes	structural	trigger
rotation	slag(ging)	struggling	trimmer
route	slight(ly)	strung	tube(s)
rpm	slip	subjected	tubing
rugged	socket(s)	submerged	tungsten
ruin	soldering	submerging	twisted
sampling	solid(s)	substitute	twists
saturated	soot	suitable	typically
scale	sorter	supplier(s)	unbroken
scattered	source	supplies	unconstitute
scrap	spacing	supply	undercutting
scratched	sparks	surfaces	underneath
screw(ed)	spatter	surfacing	unit*(s)
seamless	specifically	surge	unstable
seat	specification	suspended	upright
secured	specified	switch*(es*)	utility
security	specify	symbol(s)	valve*(s)
select	specs	synchronous	varied
semester	speech	tack(ing)	varies
semiautomate	speed*(s)	tank(s)	variety
separate	splice(d)	tape*	vary(ing)
separation	(r) (s)	taps	vectors
setting	spontaneous	taut	vee
settle	stability	technically	ventilation

WELDER (continued)

version	weakened	wind	wrapped
vertical	wear	wire*(s)	zero
vice	weaved	wiring	zinc
violent	weight	workplace	
visible	weld* (ed*) (er)	worn	
volt(age*) (s)	(ers) (ing*) (s)	wound	
watt(s)	wider	woven	